Appendix 1: Data Collection Protocol

Inclusion Criteria

1. Any trauma triage activation criteria (Level 1, Level 2 trauma activation)
2. At least 1 valid *International Classification of Diseases, Ninth Revision*, Clinical Modification (ICD-9-CM or ICD-10-CDM) trauma code
3. Adult patient (≥18 years of age)

Exclusion Criteria

1. Dead on arrival
2. Direct admission to the trauma service (no trauma activation)

Data Collection

Traumatically injured patients who met study criteria were identified by Emergency Medical Services (EMS). Medical assessment of the patient was performed by the EMS provider and urgent interventions were performed. At the time of EMS call to hospital triage or the EMS communications center, field patient data was input into the Trauma Intervention Prediction App (TIP), which housed the NEI-6 model (TIP-NEI-6). This was performed by EMS providers, EMS communications providers, or trauma providers depending on site preference. Data was input prior to patient arrival at the trauma center. If data was unknown or not pertinent, those variables were omitted (such as pre-hospital focused assessment with sonography for trauma [FAST] exams).

Participating institutions and EMS providers were trained on the use of the TIP-NEI-6 application via a video Zoom conference (Zoom Video Communications, Inc. 2023) for application usage and data collection. The TIP-NEI-6 application was available in both iOS and Android platforms and was downloaded to EMS, EMS communications, or trauma provider mobile devices.

A patient identifier was randomly generated by TIP-NEI-6. The patient identifier was recorded on paper or electronically on the EMS run sheet. The TIP-NEI-6 data and patient identifier was collected and managed using REDCap (Research Electronic Data Capture) electronic data capture tool hosted at the Medical College of Wisconsin(1, 2). REDCap is a secure, web-based software platform designed to support data capture for research studies, providing an intuitive interface for validated data capture, audit trails for tracking data manipulation and export procedures, automated export procedures for seamless data downloads to common statistical packages, and procedures for data integration and interoperability with external sources. The TIP-NEI-6 data was automatically imported into REDCap.

Designated collaborators at each individual site were provided with REDCap project server login details, allowing them to securely submit data to the REDCap system. Only anonymized data was input into REDCap, and no identifiable patient data was collected. The study was carried out in accordance with national and international guidelines, as well as the basic principles of the protection of the rights and dignity of Human Beings, as set out in the Helsinki Declaration (64th Assembly Fortaleza, Brazil, in October 2013), and according to locally applicable legislation.

The trauma registrar extracted the patient study participant number from the EMS run sheet. The patient study number was used to identify patients in the individual site's trauma registry. Hospital outcomes data was then obtained per the trauma registry. The trauma registry is maintained per American College of Surgeons National Trauma Data Standard(3). Additional NEI-6 variables and provider discretion for changing level of trauma activation were manually extracted from the electronic health record for eligible patients. All trauma registry and manual extraction variables were also stored in REDCap.

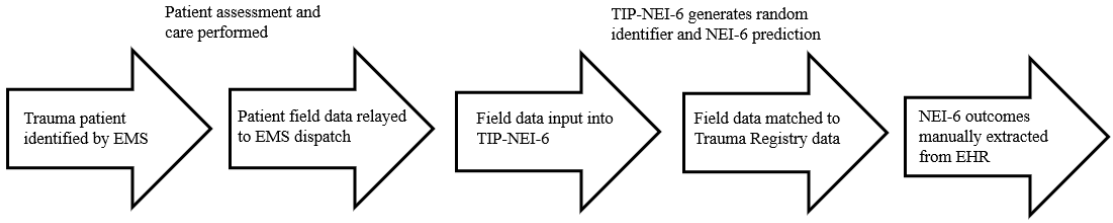

Figure 1: Patient data collection protocol flow chart.

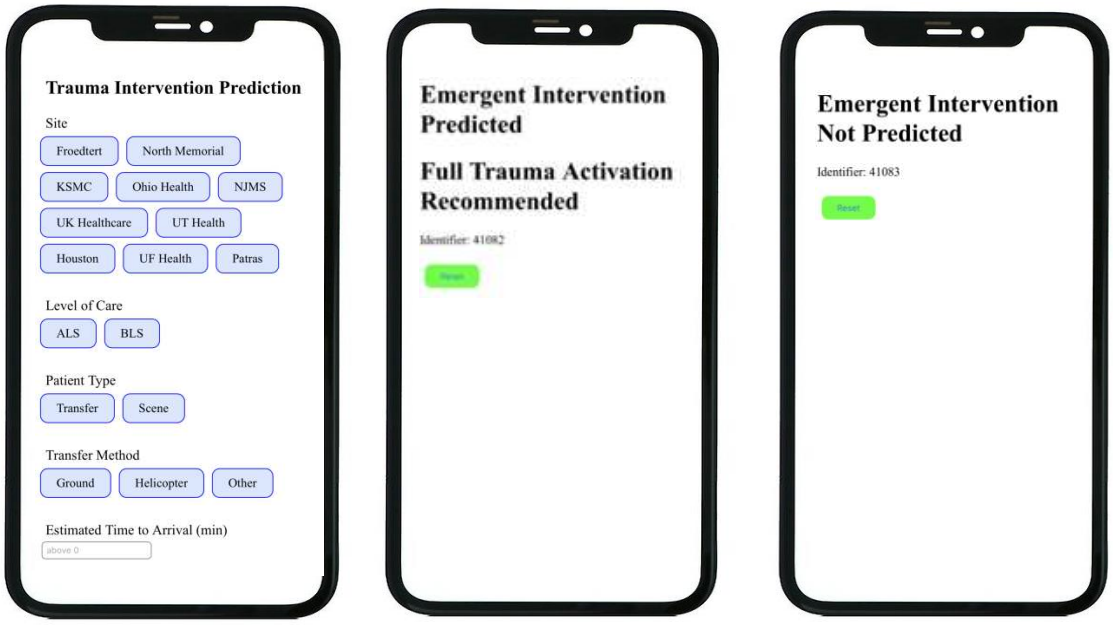

Figure 2: Screenshots of Trauma Intervention Prediction App and NEI-6 model output.

1. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009;42(2):377-81.

2. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L, et al. The REDCap consortium: Building an international community of software platform partners. J Biomed Inform. 2019;95:103208.

3. Surgeons ACo. National Trauma Data Standard Data Dictionary. Chicago, Illinois: American College of Surgeons 2023.