

## Data Elements used to Link Pre-Hospital Data with Trauma Registry Data

### Introduction to Data Linkage

Variables contained within the National Trauma Data Standard (NTDS) were defined specifically to compliment variables contained within the National Highway Traffic Safety Administration (NHTSA) 2.2 dataset. The NHTSA 2.2 dataset is a standardized collection of variables designed to characterize the pre-hospital environment and the patient care provided by Emergency Medical Services (EMS) providers prior to the patient arriving at the hospital. Variables that are common to both datasets are defined similarly, allowing data to be shared between the two datasets. The advantage to trauma registries is that, given the appropriate hardware infrastructure and software translation table, 36% of the total variables contained in the NTDS can be automatically completed (auto-populated) in the trauma registry by information transmitted electronically from a NHTSA 2.2 compliant EMS record. The advantage to EMS registries is that patient outcome information available in hospital records can be “back-populated” into an EMS registry to provide benchmarks for quality and performance indicators.

The purpose of the software translation table is to ensure that information contained in the NHTSA 2.2 database is correctly translated and interpreted by the NTDS database. This translation table is available and may be acquired by contacting the American College of Surgeons ([www.ntdb.org](http://www.ntdb.org)).

The purpose of this appendix is to identify variables defined in the NHTSA 2.2 or the NTDS datasets (or both) that may be used to “link” an EMS patient care record with a trauma registry record describing the same patient. There are several methods that may be employed to ensure that data correctly “links” a patient in the EMS record to the same patient in a trauma registry. A software product may “track” patients from pre-hospital care through the hospital stay using a common unique patient identifier. Another approach utilizes demographic and patient information collected in the EMS registry and trauma registry to “probabilistically” or “deterministically” link the right patient records together. Deterministic and probabilistic linkage are established methods that utilize variables common in both datasets to determine if two different records (one EMS record and one trauma record) are associated with the same patient and health care event.<sup>1-3</sup>

The variables defined in this appendix have, in the past, proven highly reliable and accurate at identify records associated with the same patient in different registries.<sup>4</sup> To successfully utilize a probabilistic (or deterministic) linkage process it is not necessary that common demographic variables be defined exactly as listed here (i.e., exact XSDs) or that these specific variables be utilized. These variables serve as an example of how identified variables may be used to correctly link patient records together. It would be advisable to contact a statistician when constructing an algorithm for linking patient records within the same database or across different databases.

## References:

1. Newgard CD. Validation of probabilistic linkage to match de-identified ambulance records to a state trauma registry. *Acad Emerg Med.* 2006;13:69-75.
2. Clark DE. Practical introduction to record linkage for injury research. *Inj Prev.* 2004;10:186-91.
3. Clark DE, Hahn DR. Comparison of probabilistic and deterministic record linkage in the development of a statewide trauma registry. *Proc Annu Symp Comput Appl Med Care.* 1995:397-401.
4. Cook LJ, Olson LM, Dean JM. Probabilistic record linkage: relationships between file sizes, identifiers and match weights. *Methods Inf Med.* 2001;40:196-203.

## **LAST NAME**

**Data Format** [text]

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### **Definition**

The patient's last (family) name

### **NHTSA 2.2.1 Field Values**

Relevant value for data element.

### **Uses**

- Value used to probabilistically link to EMS record

### **References in NHTSA Version 2.2.1 Dataset**

NHTSA V.2.2.1 - E06\_01

## **FIRST NAME**

**Data Format** [text]

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### **Definition**

The patient's first (given) name

### **NHTSA 2.2.1 Field Values**

Relevant value for data element

### **Uses**

- Value used to probabilistically link to EMS record

### **References in NHTSA Version 2.2.1 Dataset**

NHTSA V.2.2.1 - E06\_02

## **PATIENT'S HOME ZIP CODE**

**Data Format** [text]

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### **Definition**

The patient's home ZIP code of primary residence.

### **NTDS and NHTSA 2.2.1 Field Values**

Relevant value for data element

### **Additional Information**

- Can be stored as a 5 or 9 digit code (XXXXX-XXXX).
- May require adherence to HIPAA regulations.

### **Uses**

- Value used to probabilistically link to EMS record

### **References in NHTSA Version 2.2.1 Dataset**

NHTSA V.2.2.1 - E06\_08

## **SOCIAL SECURITY NUMBER**

**Data Format** [number]

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### **Definition**

The patient's social security number

### **NHTSA 2.2.1 Field Values**

Relevant value for data element

### **Uses**

- Value used to probabilistically link to EMS record

### **References in NHTSA Version 2.2.1 Dataset**

NHTSA V.2.2.1 - E06\_10

## SEX

Data Format [combo] single-choice

*National Element*

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### Definition

The patient's sex.

### NTDS Field Values

1 Male

2 Female

### NHTSA 2.2.1 Field Values

650 Male

655 Female

### Uses

- Value used to probabilistically link to EMS record

### References in NHTSA Version 2.2.1 Dataset

NHTSA V.2.2.1 - E06\_08

**RACE****Data Format** [combo] single-choice**National Element****Definition**

The patient's race.

**NTDS Field Values**

1 Asian

2 Native Hawaiian or Other Pacific Islander

3 Other Race

4 American Indian

5 Black or African American

6 White

**NHTSA 2.2.1 Field Values**

665 Asian

675 Native Hawaiian or Other Pacific Islander

685 Other Race

660 American Indian

670 Black or African American

680 White

**Uses**

- Value used to probabilistically link to EMS record.

**References in NHTSA Version 2.2.1 Dataset**

NHTSA V.2.2.1 - E06\_12

## **ETHNICITY**

**Data Format** [combo] single-choice

***National Element***

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### **Definition**

The patient's ethnicity.

### **NTDS Field Values**

1 Hispanic or Latino

2 Not Hispanic or Latino

### **NHTSA 2.2.1 Field Values**

690 Hispanic or Latino

695 Not Hispanic or Latino

### **Uses**

- Value used to probabilistically link to EMS record

### **References in NHTSA Version 2.2.1 Dataset**

NHTSA V.2.2.1 - E06\_13

## **AGE**

**Data Format** [number]

***National Element***

D\_08

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### **Definition**

The patient's age at the time of injury (best approximation)

### **NTDS and NHTSA 2.2.1 Field Values**

- Relevant value for data element

### **Uses**

- Value used to probabilistically link to EMS record

### **References in NHTSA Version 2.2.1 Dataset**

NHTSA V.2.2.1 - E06\_14

**AGE UNITS****Data Format** [combo] single-choice**National Element****Definition**

The units used to document the patient's age (Years, Months, Days, Hours)

**NTDS Field Values**

1 Hours                      3 Months

2 Days                      4 Years

**NHTSA 2.2.1 Field Values**

700 Hours                      705 Days

710 Months                      715 Years

**Uses**

- Value used to probabilistically link to EMS record

**References in NHTSA Version 2.2.1 Dataset**

NHTSA V.2.2.1 - E06\_15

## **DATE OF BIRTH**

**Data Format** [date]

***National Element***

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### **Definition**

The patient's date of birth.

### **NTDS and NHTSA 2.2.1 Field Values**

- Relevant value for data element

### **Uses**

- Value used to probabilistically link to EMS record

### **References in NHTSA Version 2.2.1 Dataset**

NHTSA V.2.2.1 - E06\_