Are You Confident In Your Data?

OEMS Division of Trauma and Critical Care
Epidemiology Program

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What is the issue?

The limited time busy EMS providers have to enter data and the high turnover of EMS patients can lead to **INACCURATE DATA ENTRY.**
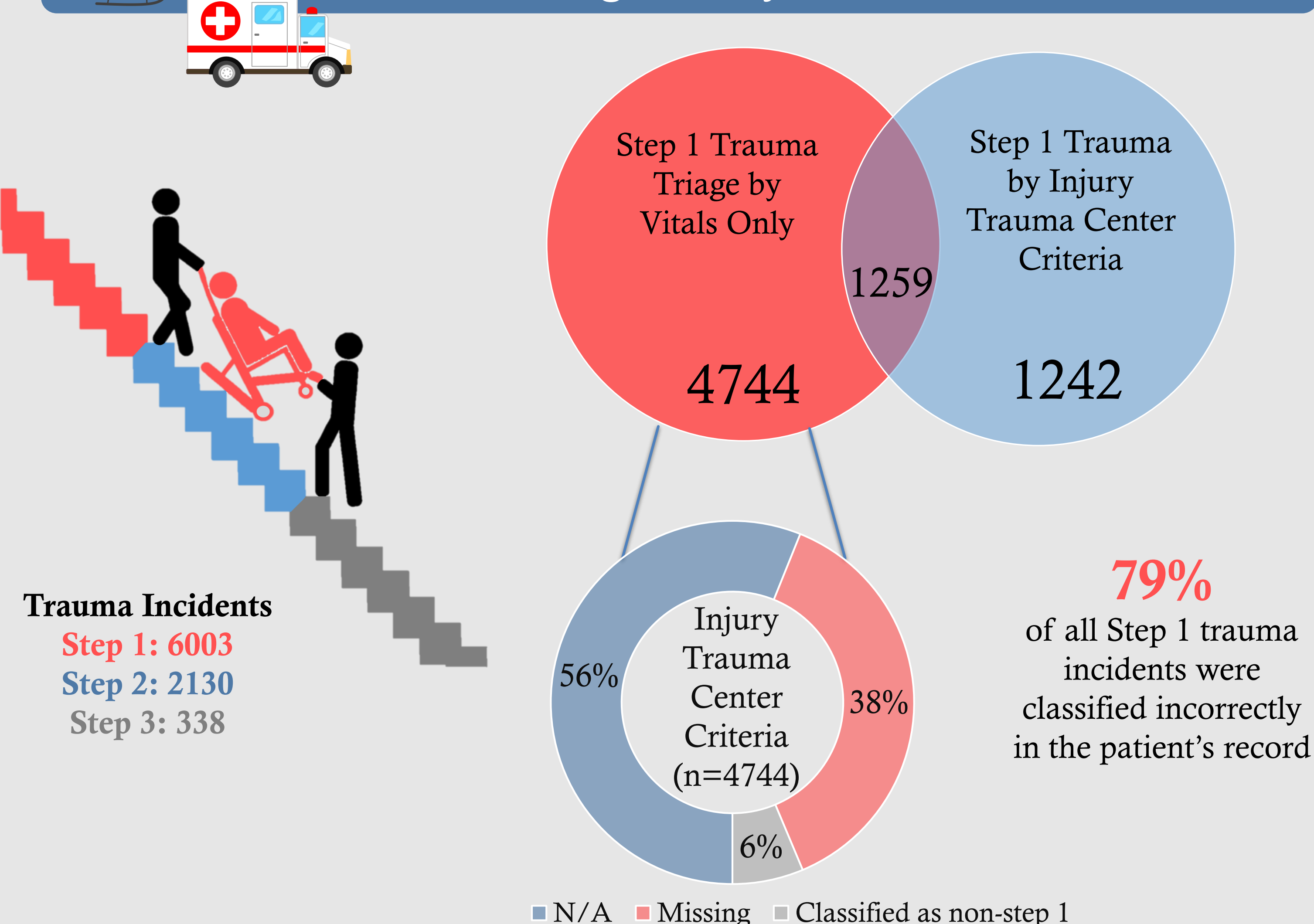
What errors are seen?

The most common data quality issues include **incomplete records**, **incorrect data**, and **missing key validation fields**.

What is the impact?

Inaccurate data prevents OEMS from being able to conduct life-saving research, significantly increases the amount of time OEMS staff spend on reconciling and cleaning data, and **misrepresents the work Virginia EMS providers do every day.**
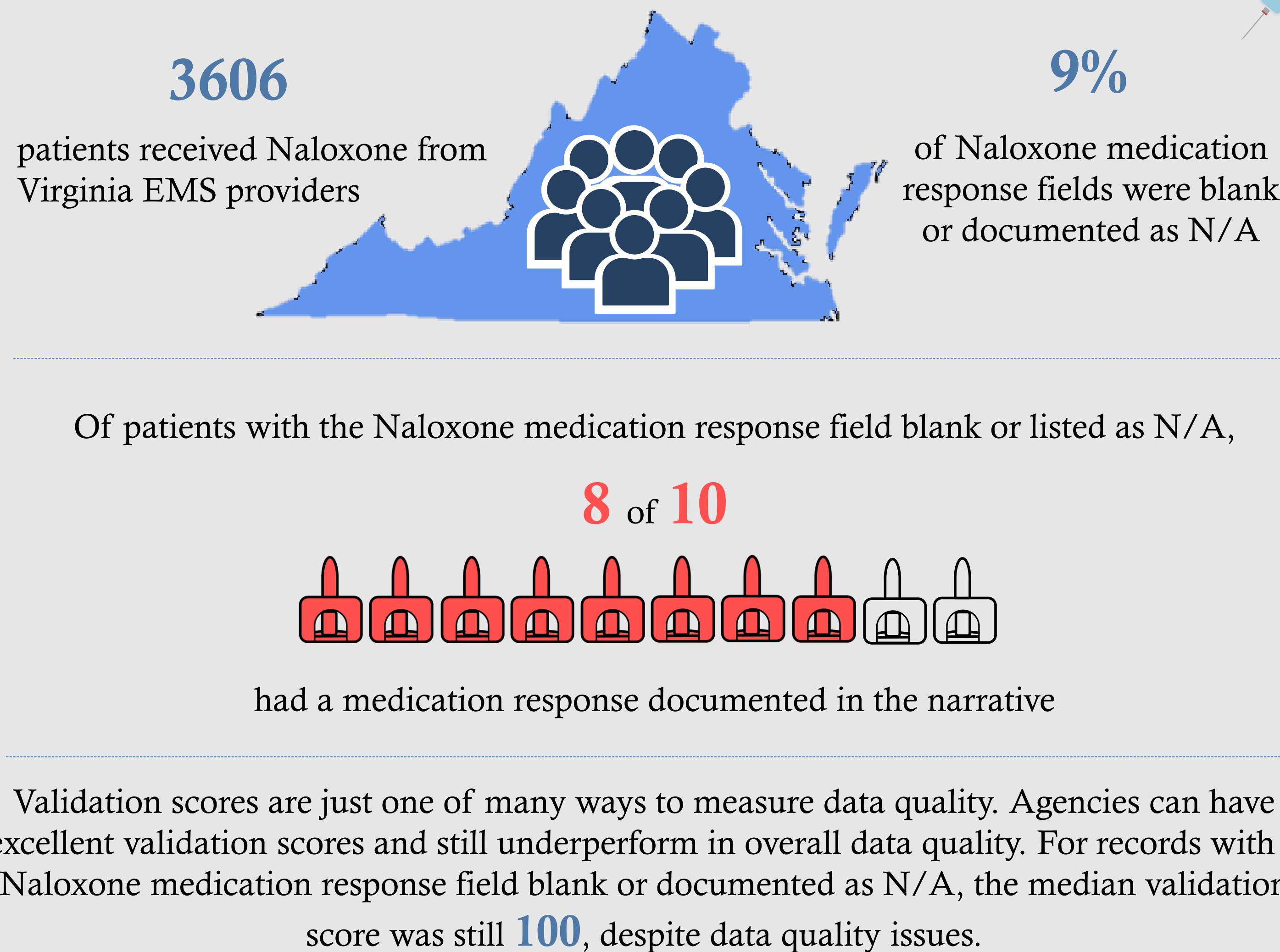

Trauma Triage, July 2018 – June 2019

Step 1 Trauma Triage by Vitals Only: 4744
Step 1 Trauma by Injury Trauma Center Criteria: 1242
Overlap: 1259

Injury Trauma Center Criteria (n=4744)
- 56%
- 38%
- 6%

N/A · Missing · Classified as non-step 1

79% of all Step 1 trauma incidents were classified incorrectly in the patient's record

Trauma Incidents
Step 1: 6003
Step 2: 2130
Step 3: 338

34% of all trauma transports had no injury trauma center criteria listed

49% of trauma patients with missing age had a DOB listed

25% of trauma patients with age units of days, hours, minutes, or months had an incorrect age listed

Trauma Triage Criteria

Step 1
- Glasgow Coma Scale < 14 or
- Systolic Blood Pressure < 90 or
- Respiratory Rate < 10 or > 29 (< 20 in infant < 1 year)

Step 2
- Penetrating injuries to the head, neck, torso, or extremities proximal to the elbow and knee
- Flail chest
- Pelvic fracture, open or depressed skull fracture, or 2 or more proximal long-bone fractures
- Crushed, degloved, or mangled extremity
- Amputation proximal to the wrist and ankle
- Paralysis

Step 3
- Falls in children of > 10 ft or 2-3 times the height of the child
- Falls in older adults of >20 ft
- High-risk auto crash with ejection from automobile, intrusion > 12" into the occupant site or > 18" in any site, death in the same passenger compartment, or vehicle automatic crash notification data consistent with a high-risk injury
- Motorcycle crash of > 20 mph
- Automobile vs. pedestrian/bicyclist crash with the pedestrian/bicyclist thrown, run over, or hit with significant (>20 mph) impact

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Naloxone Administrations, January – June 2019

3606 patients received Naloxone from Virginia EMS providers

9% of Naloxone medication response fields were blank or documented as N/A

Of patients with the Naloxone medication response field blank or listed as N/A,

8 of **10** had a medication response documented in the narrative

Validation scores are just one of many ways to measure data quality. Agencies can have excellent validation scores and still underperform in overall data quality. For records with a Naloxone medication response field blank or documented as N/A, the median validation score was still **100**, despite data quality issues.

Incident Validity Scores, January – June 2019

Incident validity scores are based on the EMS Minimum Dataset and Quality Standards. Scores are calculated for each incident reported to the Virginia Prehospital Information Bridge (Elite v3) based on how many required fields are completed for that incident. In the below table, incident validity scores for all agencies within an EMS Council Region have been averaged together to create a regional score.

EMS Council Regions	January	February	March	April	May	June
Blue Ridge	94.31	95.81	95.95	95.58	96.17	96.64
Central Shenandoah	99.63	99.29	99.26	99.15	98.86	99.40
Lord Fairfax	98.08	96.50	98.98	99.01	99.58	98.62
Northern Virginia	97.79	97.16	97.10	97.36	97.12	97.62
Old Dominion	98.30	97.89	97.69	94.39	97.95	98.29
Peninsulas	99.10	96.47	97.09	97.51	97.30	97.44
Rappahannock	98.95	98.80	98.07	98.77	99.08	99.48
Southwest Virginia	74.04	91.74	91.63	92.21	92.80	92.70
Thomas Jefferson	89.32	91.58	92.49	93.09	93.74	92.19
Tidewater	95.59	96.17	96.15	96.01	95.93	96.64
Western Virginia	99.00	98.38	98.65	98.56	97.63	98.32

Green Validation Scores: ≥ 98.0   **Yellow** Validation Scores: 95.0—97.9   **Red** Validation Scores: ≤ 94.9

Other Data Quality Issues

From January – June 2019, 48 patients > 110 years of age were reported to Elite. Of these, **37.5%** had an age < 110 years documented in the narrative.

From January – June 2019, **815,225** EMS calls were submitted. Of these, **44,447 (6.1%)** records were missing patient sex and **16,759 (2.3%)** documented patient sex as not applicable. Additionally, **63,249 (8.7%)** records were missing patient age.

In 2019, 11 records were created in response to a Virginia mass casualty incident. Of these, only **2 (18.2%)** correctly documented a response of "yes" in the "Scene Mass Casualty Incident" field.

Data About Data

Virginia EMS agencies submit more than **125,000** records every month, totaling more than **1.5M** records submitted per year.

Total number of Virginia EMS agencies: 605
Total reporting all required demographics data to OEMS as of Q3 2019: **27%**

From 2014 - 2018, documentation of vital signs meeting Step 1 Trauma Triage Criteria dramatically improved.

GCS: **92.7%** decrease in missing data
Respiratory Rate: **83.3%** decrease in missing data
Systolic Blood Pressure: **50%** decrease in missing data
Records missing at least one vital sign: **91.2%** decrease in missing data

What Can You Do?

- **Always** use the Virginia Data Dictionary to verify that data submitted is accurate and aligns with Virginia requirements.
- Fully complete records with **all** available information, including medication response, trauma criteria, and demographics.
- **Double check** data for errors, inconsistencies, and implausible values.
- Understand that validation rules can help agencies ensure data is submitted, but cannot catch spelling errors or validate against values that are undefined. Agencies can have excellent validation scores and still underperform in overall data quality.
- If a patient's demographic information (e.g., date of birth, age) is unavailable, leave the field blank. Adding implausible information increases the time required for quality assurance of incorrect records and skews conclusions that can be made from data.