Virginia Department of Health

Office of Emergency Medical Services (OEMS)

Quarterly Report on Trauma Incidents

Q4 2022*

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This report is based on the deliberations of the System Improvement Committee and analyses performed by Office of EMS Epidemiology staff.

Introduction

Section B 3. of the Code of Virginia (§32.1-111.3) requires the monitoring of the quality of the Commonwealth's emergency medical services (EMS) and trauma services using data from the EMS patient care information system. The EMS Advisory Board reviews and analyzes such data quarterly and reports its findings to the Commissioner. The Advisory Board has delegated this function to the System Improvement Committee (formerly the Trauma Performance Improvement Committee).

This quarterly report focuses on four key areas:

1. Completeness of prehospital vital sign documentation (blood pressure, respiratory rate, and Glasgow Coma Score) as required in Step 1 of the Virginia Field Trauma Triage Decision Scheme.
2. The number of trauma patients treated and transported by EMS agencies.
3. The number of trauma patients who met Step 1 (vitals), Step 2 (anatomy of injury), and Step 3 (mechanism of injury/impact) Virginia Field Trauma Triage Criteria.
4. The number of patients meeting trauma triage criteria transported to hospitals not designated as trauma centers.

The results reported here represent a high-level summary of the findings. This report describes how each EMS Council Region is performing. The report will be provided to the appropriate Regional EMS Council Director for each region. The Directors will be given an opportunity to provide feedback, which may explain special circumstances for which an exception occurred. The findings of this report and any feedback from the Directors will be used to drive education and improve the Trauma Triage Plan.

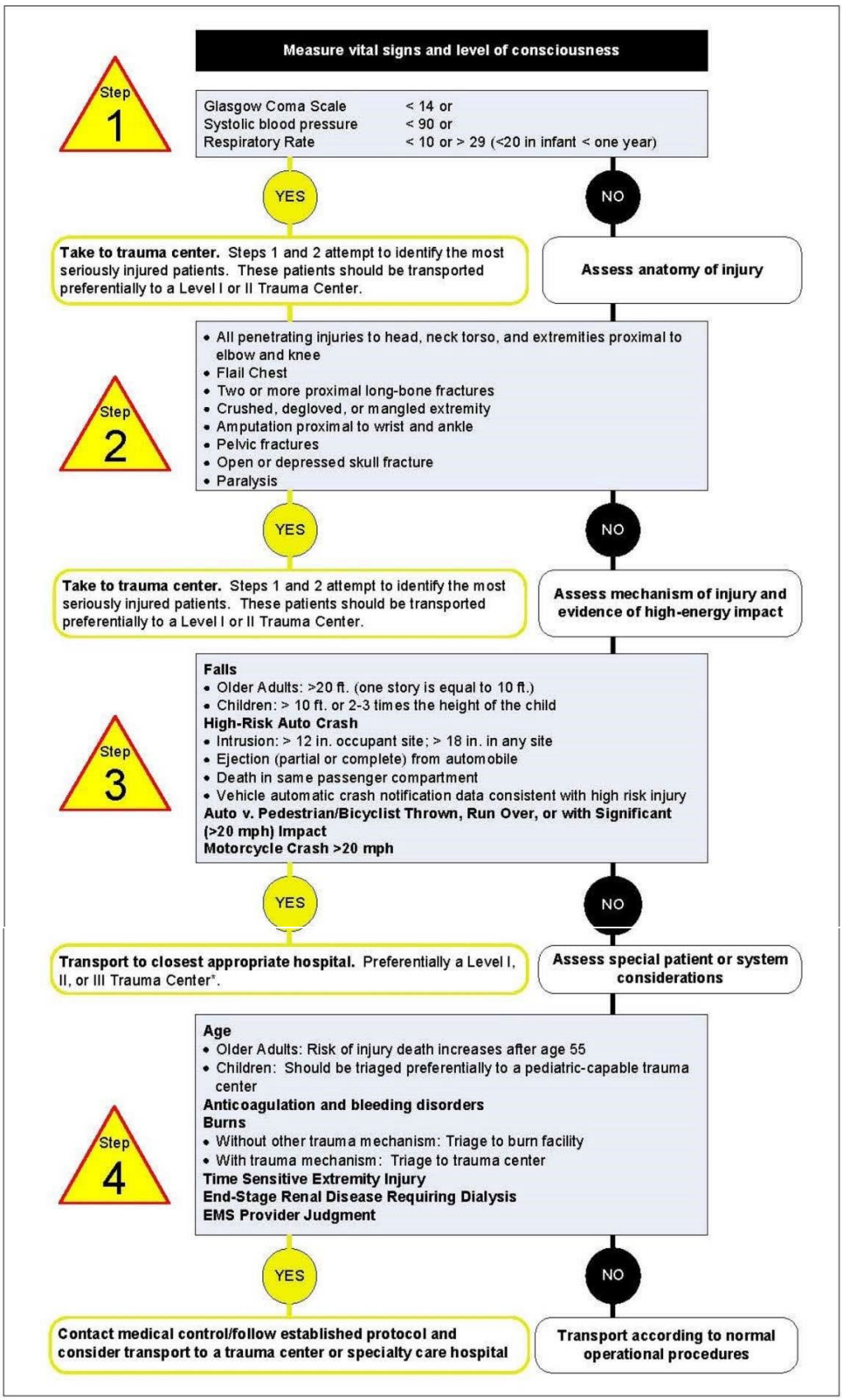
EMS patient data is extracted from patient medical records submitted by EMS agencies to the Virginia Pre-Hospital Information Bridge (VPHIB) program (Elite v3) maintained within the Virginia Department of Health's (VDH) Office of Emergency Medical Services (OEMS). Data summarized in this report represent EMS responses that occurred during the fourth quarter of 2022 (July through September) and were entered into ESO as of 02/10/2023. VPHIB v3 data are based on the National EMS Information System (NEMSIS) standards.

This report includes all EMS responses categorized as trauma incidents using the following guidelines (Table 1).

Table 1. Definition of Trauma Patients within VPHIB version 3

Type of Service Requested	
911 Response (Scene)	
Incident/Patient Disposition	
Patient Treated, Transported by this EMS unit	
Situation Provider Primary Impression (ICD-10-CM)	
• S00-S09 (Injuries to the head) • S10-S19 (Injuries to the neck) • S20-S29 (Injuries to the thorax) • S30-S39 (Injuries to the abdomen, lower back, lumbar spine, pelvis, and external genitals) • S40-S49 (Injuries to the shoulder and upper arm) • S50-S59 (Injuries to the elbow and forearm) • S60-S69 (Injuries to the wrist, hand, and fingers) • S70-S79 (Injuries to the hip and thigh) • S80-S89 (Injuries to the knee and lower leg) • S90-S99 (Injuries to the ankle and foot) • T07 (Injuries involving multiple body regions) • T14 (Injury of unspecified body region) • T20-T25 (Burns and corrosions of external body surfaces, specified by site) • T26-T28 (Burns and corrosions confined to eye and internal organs) • T30-T32 (Burns and corrosions of multiple and unspecified body regions) • T75.0 (Effects of lightning) • T75.4 (Electrocution) (With 7th digit character modifier of A, B, or C; D through S are excluded)	*Excluding:* • *S00 (Superficial injuries of the head)* • *S10 (Superficial injuries of the neck)* • *S20 (Superficial injuries of the thorax)* • *S30 (Superficial injuries of the abdomen, pelvis, lower back and external genitals)* • *S40 (Superficial injuries of shoulder and upper arm)* • *S50 (Superficial injuries of elbow and forearm)* • *S60 (Superficial injuries of wrist, hand, and fingers)* • *S70 (Superficial injuries of hip and thigh)* • *S80 (Superficial injuries of knee and lower leg)* • *S90 (Superficial injuries of ankle, foot, and toes)*

Figure 1. Virginia Field Trauma Triage Decision Scheme



Virginia Trauma Summary, Fourth Quarter, 2022

EMS agencies in Virginia responded to a total of 427,646 EMS calls; of that total, 278,797 (65.2%) patients had a disposition of treated and transported by the unit, 51,641 (12.1%) had a disposition of canceled, 31,292 (7.3%) patients had a disposition of EMS assist, 6,692 (1.6%) patients had a disposition of treated and transferred care to another unit, 4,180 (1.0%) patients were documented as dead at the scene, and 55,044 (12.9%) patients had some other incident disposition (e.g., patient treated and released AMA, patient treated and transported by private vehicle, etc.). Out of the total EMS calls, **24,617** (**5.8%**) incidents were classified as trauma incidents. There were 873 (0.2%) incidents that otherwise met all criteria of the Trauma Patient Definition (Table 1) but were not included in the total trauma count due to their disposition of treated and transferred care.

Of the 24,617 total trauma incidents, Northern Virginia EMS Council had the highest number of trauma calls (5,946; 24.2%), followed by the Old Dominion EMS Alliance (4,812; 19.5%). Trauma incident numbers for the quarter, broken down by month and Regional EMS Council, are shown in Figure 2. Tables 2-4 summarize the body regions most frequently affected by trauma, the top 10 hospitals receiving trauma transports, and vital signs data quality for trauma incidents.

Figure 2. Monthly Trauma Incidents by Regional EMS Council, Fourth Quarter, 2022, Virginia

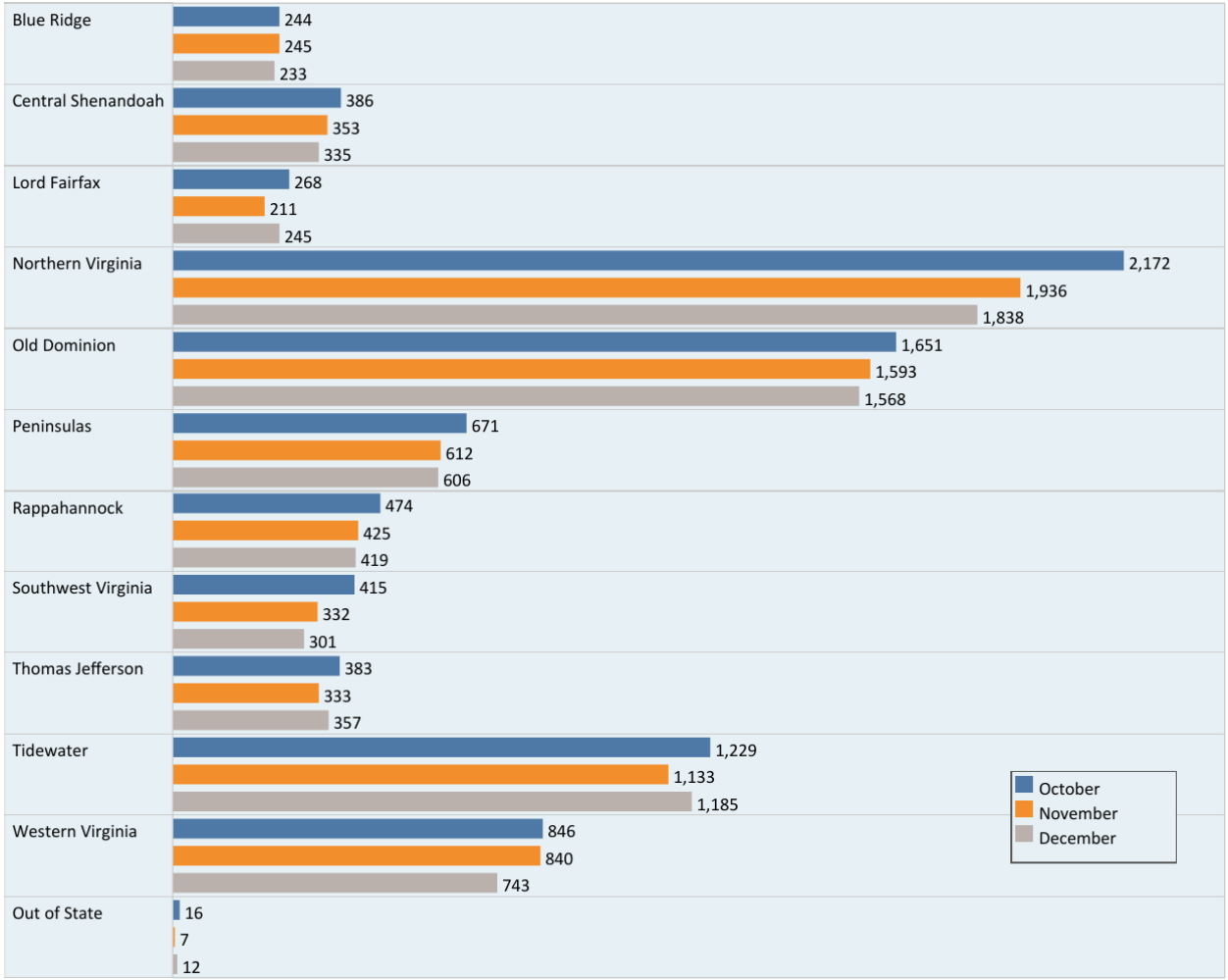


Table 2. Trauma Incidents by Abbreviated Injury Scale (AIS) Body Region, Fourth Quarter 2022, Virginia

AIS Region	Counts of Incidents
Lower extremity	5,726 (23.3%)
Unspecified	5,151 (20.9%)
Head	4,980 (20.2%)
Upper extremity	3,331 (13.5%)
Face	1,918 (7.8%)
Spine	1,394 (5.7%)
Neck	956 (3.9%)
Thorax	570 (2.3%)
Abdomen	448 (1.8%)
Multiple	143 (0.6%)
Grand Total	**24,617 (100.0%)**

Table 3. Top Ten Hospital Destinations for Trauma Incidents, Fourth Quarter 2022, Virginia

Destination Hospital for Trauma Incidents	Counts of Incidents
Inova Fairfax Hospital	1,444 (5.9%)
Sentara Norfolk General Hospital	926 (3.8%)
Carilion Roanoke Memorial Hospital	907 (3.7%)
Riverside Regional Medical Center	885 (3.6%)
VCU Health Systems	873 (3.5%)
MWHC Mary Washington Hospital	755 (3.1%)
UVA Health System	724 (2.9%)
Inova Loudoun Hospital	604 (2.5%)
HCA Chippenham Hospital	596 (2.4%)
HCA Reston Hospital Center	592 (2.4%)

Table 4. Vital Signs Data Quality for Trauma Incidents, Fourth Quarter 2022, Virginia

Vital Signs Data Quality	Counts of Incidents
Total Number of Trauma Incidents	24,617
Patients with All 3 Vital Signs Reported	23,938 (97.2%)
Patients with Incomplete* Vital Signs	679 (2.8%)
Patients with Systolic Blood Pressure Reported	24,567 (99.8%)
Patients with Respiratory Rate Reported	24,335 (98.9%)
Patients with Glasgow Coma Score Reported	24,200 (98.3%)

*Incomplete vital signs are missing one or more of the vital signs required in Step 1 of the Trauma Triage algorithm (e.g., Systolic Blood Pressure, Respiratory Rate, or Glasgow Coma Score).

Trauma Incidents Meeting Virginia Trauma Triage Criteria

- Of the 24,617 trauma incidents reported by EMS during the fourth quarter of 2022, 1,922 (7.8%) met Trauma Triage Step 1 criteria, 396 (1.6%) met Step 2 criteria, and 468 (1.9%) met Step 3 criteria. Incidents can meet criteria for more than one step; those incidents were classified into the highest severity level met. For example, if an incident met both Step 1 and Step 2 criteria, it was counted as a Step 1 incident.
- Among the incidents meeting Step 1 criteria, 1,646 (85.6%) were classified as meeting Step 1 based on reported vital signs (see Appendix 1). The remaining 276 (14.4%) incidents were classified as meeting Step 1 based on the provider's impression, as reported in the "Trauma Center Criteria" field in the patient care report.
- Incidents meeting Step 2 and Step 3 were based solely on the "Trauma Center Criteria" and "Vehicular, Pedestrian, or Other Injury Risk Factor" fields.
- A total of 87 (0.4%) patients were involved in mass casualty incidents (MCI), which are not subject to the same trauma triage decision scheme guidelines. Therefore, these MCI incidents were excluded from any decision scheme analysis.

Pediatric Patients (Age < 15)

Trauma patients <15 years old are considered pediatric patients per trauma triage criteria. Of the 24,617 trauma incidents reported by EMS during the fourth quarter of 2022, 1,136 (4.6%) occurred among pediatric patients. Of the 1,922 Virginia trauma incidents meeting Step 1 trauma criteria, 173 (9.0%) occurred among pediatric patients. One Step 1 pediatric patient was involved in a mass casualty incident and was excluded from the trauma triage decision scheme analysis, leaving a remaining 172 non-MCI Step 1 pediatric patients (further details are shown below).

Table 5. Hospital Destination Type for Pediatric Patients Meeting Step 1 Criteria by Regional EMS Council, Fourth Quarter 2022, Virginia

		Trauma Hospital				
EMS Council Region	Met Step 1	Level I	Level II	Level III	Pediatric	Non-Trauma
Blue Ridge	7	0	6	0	1	0
Central Shenandoah	6	0	0	0	0	6
Lord Fairfax	3	0	1	0	0	2
Northern Virginia	56	25	5	11	5	10
Old Dominion	22	6	0	2	8	6
Peninsulas	11	0	7	0	2	2
Rappahannock	8	0	5	0	0	3
Southwest Virginia	2	0	0	0	0	2
Thomas Jefferson	8	8	0	0	0	0
Tidewater	33	3	0	0	23	7
Western Virginia	16	0	0	0	11	5
Grand Total	**172**	**42 (24.4%)**	**24 (14.0%)**	**13 (7.6%)**	**50 (29.1%)**	**43 (25.0%)**

- There were 56 incidents involving pediatric patients that met Step 1 trauma criteria that were taken to a Level III trauma center or lower designation.
- Among the 396 incidents meeting Step 2 criteria during the fourth quarter of 2022, 13 (3.3%) occurred among pediatric patients. Zero Step 2 pediatric patients were involved in mass casualty incidents. Of the 13 non-MCI Step 2 pediatric patients, 7 (53.8%) were taken to a pediatric trauma center, 2 (15.4%) were taken to a Level I trauma center, 3 (23.1%) were taken to a Level III trauma center, and 1 (7.7%) was taken to a non-trauma designated location.
- Of the 468 incidents that met Step 3 criteria during the fourth quarter of 2022, 24 (5.1%) occurred among pediatric patients. Two Step 3 pediatric patients were involved in mass casualty incidents and were excluded from the trauma triage decision scheme analysis. Of the remaining 22 non-MCI Step 3 pediatric patients, 9 (40.9%) were taken to a pediatric trauma center, 5 (22.7%) were taken to a Level I trauma center, 1 (4.5%) was taken to a Level II trauma center, 4 (18.2%) were taken to a Level III trauma center, and 3 (13.6%) were taken to non-trauma designated hospitals.

Geriatric Patients (Age ≥ 65)

There were 11,185 (45.4% of total trauma incidents) reports of trauma among geriatric patients during the fourth quarter of 2022. Of the 1,922 Virginia trauma incidents meeting Step 1 trauma criteria, 801 (41.7%) occurred among geriatric patients. A total of two Step 1 geriatric patients were involved in

mass casualty incidents and were excluded from the trauma triage decision scheme analysis, leaving a remaining 799 non-MCI Step 1 geriatric patients (further details are shown below).

Table 6. Hospital Destination Type for Geriatric Patients Meeting Step 1 Criteria by Regional EMS Council, Fourth Quarter 2022, Virginia

		Trauma Hospital			
EMS Council Region	Met Step 1	Level I	Level II	Level III	Non-Trauma
Blue Ridge	26	3	20	0	3
Central Shenandoah	40	0	0	0	40
Lord Fairfax	28	0	19	0	9
Northern Virginia	202	66	51	39	46
Old Dominion	134	30	25	18	61
Peninsulas	50	1	25	0	24
Rappahannock	48	1	24	0	23
Southwest Virginia	43	4	0	6	33
Thomas Jefferson	45	26	1	0	18
Tidewater	79	9	4	22	44
Western Virginia	104	43	0	12	49
Grand Total	**799**	**183 (22.9%)**	**169 (21.2%)**	**97 (12.1%)**	**350 (43.8%)**

- There were 447 incidents involving geriatric patients who met Step 1 trauma criteria who were taken to a Level III trauma center or lower designation.
- Of the 350 geriatric patients who met Step 1 criteria and were taken to non-trauma designated hospitals, 43 (12.3%) had an EMS provider primary impression of an isolated hip injury.
- Among the 396 incidents meeting Step 2 criteria during the fourth quarter of 2022, 79 (19.9%) occurred among geriatric patients. Zero Step 2 geriatric patients were involved in mass casualty incidents. Of the 79 non-MCI geriatric Step 2 patients, 35 (44.3%) patients were taken to a Level I trauma center, 14 (17.7%) were taken to a Level II trauma center, 7 (8.9%) were taken to a Level III trauma center, and 23 (29.1%) were taken to non-trauma designated hospitals.
- Of the 468 incidents that met Step 3 criteria during the fourth quarter of 2022, 62 (13.2%) occurred among geriatric patients. Zero Step 3 geriatric patients were involved in mass casualty incidents. Of the 62 non-MCI Step 3 geriatric patients, 18 (29.0%) patients were taken to a Level I trauma center, 6 (9.7%) were taken to a Level II trauma center, 9 (14.5%) were taken to a Level III trauma center, and 29 (46.8%) were taken to non-trauma designated hospitals.
- For 46 incidents, patient age was recorded to be greater than 100 years. Quality assurance of these incidents showed that 19.6% of the entered ages were incorrect.

Adult Patients (15 ≥ Age < 65)

The majority of the 24,617 trauma cases that occurred during the fourth quarter of 2022 were among adult patients (n=12,290, 49.9% of all trauma incidents). Of the 1,922 Virginia trauma incidents meeting Step 1 trauma criteria, 944 (49.1%) occurred among adult patients. A total of four Step 1 adult patients were involved in mass casualty incidents and were excluded from the trauma triage decision scheme analysis, leaving a remaining 940 non-MCI Step 1 adult patients (further details are shown below).

Table 7. Hospital Destination Type for Adult Patients Meeting Step 1 Criteria by Regional EMS Council, Fourth Quarter 2022, Virginia

		Trauma Hospital			
EMS Council Region	Met Step 1	Level I	Level II	Level III	Non-Trauma
Blue Ridge	24	8	16	0	0
Central Shenandoah	29	3	0	0	26
Lord Fairfax	16	0	14	0	2
Northern Virginia	237	118	65	20	34
Old Dominion	201	120	16	31	34
Peninsulas	68	0	50	0	18
Rappahannock	44	3	29	1	11
Southwest Virginia	33	5	1	8	19
Thomas Jefferson	38	35	0	0	3
Tidewater	166	94	2	40	30
Western Virginia	79	45	0	5	29
Out of State	5	4	0	0	1
Grand Total	**940**	**435 (46.3%)**	**193 (20.5%)**	**105 (11.2%)**	**207 (22.0%)**

- There were 312 incidents involving adult patients who met Step 1 trauma criteria who were taken to a Level III trauma center or lower designation.
- Among the 396 incidents meeting Step 2 criteria during the fourth quarter of 2022, 304 (76.8%) occurred among adult patients. One Step 2 adult patient was involved in a mass casualty incident and was excluded from the trauma triage decision scheme analysis. Of the remaining 303 non-MCI geriatric Step 2 patients, 204 (67.3%) patients were taken to a Level I trauma center, 37 (12.2%) patients were taken to a Level II trauma center, 26 (8.6%) were taken to a Level III trauma center, and 36 (11.9%) patients were taken to non-trauma designated hospitals.
- Among the 468 incidents meeting Step 3 criteria during the fourth quarter of 2022, 382 (81.6%) occurred among adult patients. A total of 13 Step 3 adult patients were involved in mass casualty incidents and were excluded from the trauma triage decision scheme analysis. Of the remaining 369 non-MCI Step 2 adult patients, 170 (46.1%) were taken to a Level I trauma center, 60 (16.3%) patients were taken to a Level II trauma center, 69 (18.7%) were taken to a Level III trauma center, and 70 (19.0%) patients were taken to non-trauma designated hospitals.

Air-Medical EMS Transport

There were 366 trauma patient transports by an air-medical ambulance during the fourth quarter of 2022. Of those:

- Twenty-five (6.8%) were pediatric transports, of which:
    - Zero pediatric transports were involved in mass casualty incidents.
    - Of the 25 non-MCI pediatric transports, 6 (24.0%) patients were taken to a Level I trauma center and 19 (76.0%) were taken to a pediatric trauma center.
- Ninety-four (25.7%) were geriatric transports, of which:
    - Zero geriatric transports were involved in mass casualty incidents.
    - Of the 94 non-MCI geriatric transports, 84 (89.4%) patients were taken to a Level I trauma center, 7 (7.4%) were taken to a Level II trauma center, 2 (2.1%) were taken to a Level III trauma center, and 1 (1.1%) was taken to a non-trauma designated hospital.
- Two-hundred and forty-six (67.2%) were adult transports, of which:
    - One adult transport was involved in a mass casualty incident and was excluded from the trauma triage decision scheme analysis.
    - Of the remaining 245 non-MCI adult transports, 226 (92.2%) patients were taken to a Level I trauma center, 8 (3.3%) were taken to a Level II trauma center, 2 (0.9%) were taken to a Level III trauma center, and 9 (3.7%) were taken to a non-trauma designated hospital.
- One trauma patient (0.3%) transported by air medical was of unknown age and was taken to a non-trauma center.

Causes of Injury

Trauma patient records were analyzed to identify the causes of injuries in the Commonwealth of Virginia. Fall injuries occurred most commonly, followed by motor vehicle collision injuries. Causes of injury for the fourth quarter of 2022 are shown in Table 8.

Table 8. Frequencies and Percentages of Causes of Injury, Fourth Quarter 2022, Virginia

Primary Cause of Injury	Counts of Incidents
Falls, slips/trips	10,897 (44.3%)
MVC	5,241 (21.3%)
Blunt force trauma	1,034 (4.2%)
Penetrating trauma	540 (2.2%)
Firearm	305 (1.2%)
Non-motorized transport	190 (0.8%)
Machine-related	182 (0.7%)
Animal-related	139 (0.6%)
Burn, smoke inhalation, electrocution, explosion	124 (0.5%)
Self-harm	85 (0.3%)
Recreational	33 (0.1%)
Abuse	32 (0.1%)
Poisoning	17 (0.1%)
Overexertion/strain	15 (0.1%)
Human bite	15 (0.1%)
Asphyxiation	8 (<0.1%)
Environment/weather-related	7 (<0.1%)
Drowning	3 (<0.1%)
Aircraft	3 (<0.1%)
Unspecified	5,747 (23.3%)
Grand Total	**24,617 (100.0%)**

Under-Triage of Trauma Incidents

A Step 1 or Step 2 trauma incident is considered to be under-triaged if it was not a mass casualty incident and the patient was taken to either a Level III trauma center or a non-trauma designated hospital. A Step 3 trauma incident is considered to be under-triaged if it was not a mass casualty incident and the patient was taken to a non-trauma designated hospital. Injuries to the head, arms, or legs occurred most often among the under-triaged incidents (Table 9).

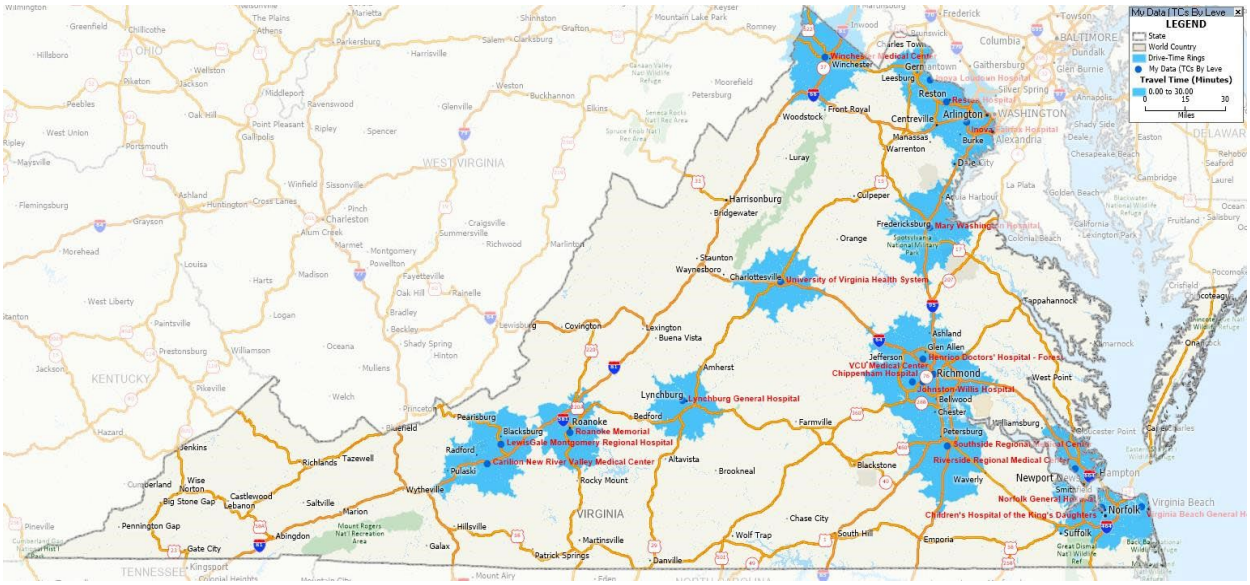
Table 9. Frequencies and Percentages of Under-Triaged Trauma Patients by AIS Body Region of Injury, Fourth Quarter 2022, Virginia

AIS Region	Counts of Incidents
Head	273 (26.8%)
Unspecified	266 (26.2%)
Lower extremity	200 (19.7%)
Upper extremity	94 (9.2%)
Face	76 (7.5%)
Spine	34 (3.3%)
Abdomen	19 (1.9%)
Thorax	19 (1.9%)
Multiple	18 (1.8%)
Neck	18 (1.8%)
Grand Total	**1,017 (100.0%)**

Distribution of Trauma Facilities across Virginia

Trauma centers across Virginia are not uniformly distributed. The upper part of the Northern Virginia EMS Council and parts of Central Virginia (e.g., the greater Richmond area) have greater access to trauma centers, as multiple trauma centers are located within close proximity. Most parts of the Old Dominion EMS Alliance, Central Shenandoah EMS Council, and Western Virginia EMS Council have very limited access to trauma centers. The Central Shenandoah EMS Council and Southwest Virginia EMS Council have no trauma centers within their EMS regions, but are reasonably close to Level II trauma centers in other EMS regions or states. The distribution of trauma centers across Virginia, surrounded by rings showing the geographical areas within a 30-minute drive of each trauma center, is shown below (Figure 4). This map displays which parts of Virginia have limited access to a trauma center.

Figure 3. Trauma Centers across Virginia, Surrounded by 30-Minute Drive Time Rings



Data Quality

Virginia EMS agencies have been working very hard to make sure they provide optimal care to their patients while also making efforts to improve data quality. Over the past years, there has been a significant improvement in trauma triage data quality. Continuation of this improvement is what the System Improvement Committee expects. The OEMS conducted quality assurance checks on trauma triage records from the fourth quarter of 2022, as described below.

- **Blank Vital Signs** (i.e., no numerical value and no pertinent negative reported): There were a total of 50 trauma incidents without systolic blood pressure documented, 282 trauma incidents without respiratory rate documented, and 417 trauma incidents without GCS documented. In some cases, vitals are unable to be obtained due to patient refusal or because the patient is a child. Such cases should be documented as Pertinent Negatives (e.g., "Refused" or "Unable to Complete"). Leaving the vital sign field blank and reporting such cases only in the patient care narrative will result in the vital sign being identified as missing.
- **Atypical Vital Signs:** Atypical vital signs are vitals with extreme values. The cutoff values for vitals to be considered atypical are chosen arbitrarily only for quality check and validation purposes. For this report, systolic blood pressures with values of less than 40 or greater than 250 and respiratory rates of less than 3 or greater than 100 were deemed extreme values. There were 29 instances of extreme systolic blood pressures and 31 instances of extreme respiratory rates, totaling 60 instances of extreme values.
- **Blank Trauma Triage Criteria:** There were 21,582 trauma incidents where the "Trauma Center Criteria" field and the "Vehicular, Pedestrian, or Other Injury Risk Factor" fields were both blank. It is understandable that not all trauma incidents meet trauma triage criteria; however, some of these records are incorrectly classified or do not report important information.
    - Of those incidents, 1,060 (4.9%) had recorded vitals meeting Step 1 trauma triage criteria.

- Step 2 and Step 3 trauma incidents may also be missing trauma triage criteria and therefore may also be incorrectly classified. However, Steps 2 and 3 trauma triage criteria are not based on vital signs, so the exact amount of misclassification cannot be identified.

- **Blank Age**
  - There were four trauma incident records where age or age units was left blank; quality assurance of the records showed that two were adult patients and the remaining two were of unknown age. An additional four patients were identified to have an unknown age during quality assurance of patient records.
    - Of the six incidents where patient age was unknown, four met Step 1 trauma triage criteria. Two of these four Step 1 patients were under-triaged; one was transported to a Level III hospital, and one was transported to a non-trauma hospital.
      - Of the remaining two incidents where patient age and Step was unknown, the reported respiratory rate was between 10 and 20. Patients less than 1 year of age with a respiratory rate between 10 and 20 meet Step 1 criteria. However, these patients could not be classified as Step 1 because their age was unknown.

Conclusions

Many factors influence the decision regarding where a patient is transported. As noted above, trauma centers are not equally distributed across Virginia. In some areas (Southwest Virginia and Northern Virginia), out of state trauma center resources are available. Despite having a total of 12 Level I and Level II trauma centers (combined) in Virginia, as well as access to several other similar facilities in surrounding states, large areas of Virginia remain underserved. The variability of resources across Virginia is often compounded by geographic and (especially in the case of Helicopter or Medevac EMS) weather factors. Although a solution to this problem is beyond the scope of this report, this variability needs to be considered when comparing the outcomes of pre-hospital trauma patients in Virginia.

Missing vital signs data in EMS records continues to be an area of focus for performance improvement efforts. Currently, about one out of every 36 patients (2.8%) have incomplete vital signs data. During the fourth quarter of 2022, 31.4% of patients not involved in a mass casualty incident who met Step 1 trauma triage criteria and 15.7% of patients not involved in a mass casualty incident who met Step 2 criteria were taken to non-trauma centers. Acknowledging these data, there may be a need to re-examine how trauma triage criteria are being applied in the field, with an eye towards the existing barriers to trauma center access, including the absence of trauma centers in broad swaths of Virginia. Whether the addition of trauma resources center would allow for improved access and care requires further study.

OEMS staff performed quality assurance on trauma triage data from the fourth quarter of 2022. Specifically, the data values that were reviewed included the vital signs used in Step 1 trauma triage criteria designation, atypical vital sign values, and trauma triage criteria fields listed as not applicable, not recorded, or blank. OEMS will continue to perform these data quality checks and will summarize findings for inclusion in future trauma triage reports.

Appendix 1: Elite v3 Data Dictionary Elements for Trauma Triage Vital Signs and Trauma Triage Criteria

eVitals.06 - SBP (Systolic Blood Pressure)

Definition

The patient's systolic blood pressure.

National Element	Yes	Pertinent Negatives (PN)	Yes
State Element	Yes	NOT Values	Yes
Version 2 Element	E14_04	Is Nillable	Yes
Usage	Required	Recurrence	1 : 1

Associated Performance Measure Initiatives

Airway Cardiac Arrest Pediatric STEMI Stroke Trauma

Attributes

NOT Values (NV)
7701001 - Not Applicable 7701003 - Not Recorded

Pertinent Negatives (PN)
8801005 - Exam Finding Not Present 8801019 - Refused 8801023 - Unable to Complete

Constraints

Data Type	minInclusive	maxInclusive
integer	0	500

Data Element Comment

Required for ACS-Field Triage and other patient scoring systems.

eVitals.14 - Respiratory Rate

Definition

The patient's respiratory rate expressed as a number per minute.

National Element	Yes	Pertinent Negatives (PN)	Yes
State Element	Yes	NOT Values	Yes
Version 2 Element	E14_11	Is Nillable	Yes
Usage	Required	Recurrence	1 : 1

Associated Performance Measure Initiatives

Airway Cardiac Arrest Pediatric STEMI Stroke Trauma

Attributes

NOT Values (NV)
7701001 - Not Applicable 7701003 - Not Recorded

Pertinent Negatives (PN)
8801005 - Exam Finding Not Present 8801019 - Refused 8801023 - Unable to Complete

Constraints

Data Type	minInclusive	maxInclusive
integer	0	300

Data Element Comment

eVitals.23 - Total Glasgow Coma Score

Definition

The patient's total Glasgow Coma Score.

National Element	No	Pertinent Negatives (PN)	Yes
State Element	Yes	NOT Values	Yes
Version 2 Element	E14_19	Is Nillable	Yes
Usage	Required	Recurrence	1 : 1

Associated Performance Measure Initiatives

Airway Cardiac Arrest Pediatric STEMI Stroke Trauma

Attributes

NOT Values (NV)

7701001 - Not Applicable 7701003 - Not Recorded 7701005 - Not Reporting

Pertinent Negatives (PN)

8801019 - Refused 8801023 - Unable to Complete

Constraints

Data Type	minInclusive	maxInclusive
integer	3	15

Data Element Comment

Can be documented or calculated from EVitals.19 (GCS-Eye), EVitals.20 (GCS-Verbal), and EVitals.21 (GCS-Motor).

eInjury.03 - Trauma Center Criteria

Definition

Physiologic and Anatomic Field Trauma Triage Criteria (steps 1 and 2) as defined by the Centers for Disease Control.

National Element	Yes	Pertinent Negatives (PN)	No
State Element	Yes	NOT Values	Yes
Version 2 Element		Is Nillable	Yes
Usage	Required	Recurrence	1 : M

Associated Performance Measure Initiatives

Trauma

Attributes

NOT Values (NV)
7701001 - Not Applicable 7701003 - Not Recorded

CorrelationID
Data Type: string **minLength:** 0 **maxLength:** 255

Code List

Code	Description
2903001	Amputation proximal to wrist or ankle
2903003	Crushed, degloved, mangled, or pulseless extremity
2903005	Chest wall instability or deformity (e.g., flail chest)
2903007	Glasgow Coma Score <= 13
2903009	Open or depressed skull fracture
2903011	Paralysis
2903013	Pelvic fractures
2903015	All penetrating injuries to head, neck, torso, and extremities proximal to elbow or knee
2903017	Respiratory Rate <10 or >29 breaths per minute (<20 in infants aged <1 year) or need for ventilatory support
2903019	Systolic Blood Pressure <90 mmHg
2903021	Two or more proximal long-bone fractures

Data Element Comment

2011 Guidelines for the Field Triage of Injured Patients - value choices for Steps 1 and 2. For falls, one story is equal to 10 feet.

Code 7701001 - Not Applicable should be used when none of the values listed in the code list for element eInjury.03 apply.

Version 3 Changes Implemented

Added to better evaluate the CDC-ACS 2011 Guidelines for the Field Triage of Injured Patients.
Website: http://www.cdc.gov/FieldTriage/