

Cohort Formation

MTQIP is a quality improvement database employing the existing trauma registry infrastructure to abstract and transmit patient data. Data definitions are based on current NTDS definitions when feasible.

Inclusion Criteria

- Trauma ICD-10-CM diagnostic code
- Blunt or penetrating mechanism of injury
- Age \geq 16 years old
- ISS \geq 5
- Transfer to another acute care hospital or in-patient observation/admission or death

Cohort Descriptions

Cohort 1 (All)

- Mechanism = Blunt or penetrating
- Age \geq 18, Age \geq 16 starting 1/1/13
- ISS \geq 5
- Hospital LOS \geq 1 day or dead

Cohort 1 (All) w/o DOA's

- Mechanism = Blunt or penetrating
- Age \geq 18, Age \geq 16 starting 1/1/13
- ISS \geq 5
- Hospital LOS \geq 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Cohort 2 (Admit trauma)

- Mechanism = Blunt or penetrating
- Age \geq 18, Age \geq 16 starting 1/1/13
- ISS \geq 5
- Hospital LOS \geq 1 day or dead
- Admit to trauma service if ED disposition not death

Cohort 2 (Admit trauma) w/o DOA's

- Mechanism = Blunt or penetrating
- Age \geq 18, Age \geq 16 starting 1/1/13
- ISS \geq 5
- Hospital LOS \geq 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Admit to trauma service if ED disposition not death

Cohort 3 (Blunt Multi-System)

- Mechanism = Blunt
- Age \geq 18, Age \geq 16 starting 1/1/13
- ISS \geq 5
- Hospital LOS \geq 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- AIS \geq 3 in at least two of the following body regions: head/neck, face, chest, abdomen, extremities, or external.

Cohort 4 (Blunt Single-System)

- Mechanism = Blunt
- Age \geq 18, Age \geq 16 starting 1/1/13
- ISS \geq 5
- Hospital LOS \geq 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- AIS \geq 3 limited to only one body region with all other body regions having a maximum AIS \leq 2 in the following body regions: head/neck, face, chest, abdomen, extremities, or external.

Cohort 5 (Penetrating)

- Mechanism = Penetrating
- Age \geq 18, Age \geq 16 starting 1/1/13
- ISS \geq 5
- Hospital LOS \geq 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Cohort 6 (Admit non-trauma Service)

- Mechanism = Blunt or Penetrating
- Age \geq 18, Age \geq 16 starting 1/1/13
- ISS \geq 5
- Hospital LOS \geq 1 day or dead

- Admit to non-trauma service if ED disposition not death
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Cohort 7 (Benchmark)

- Age \geq 16
- ISS \geq 9
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Exclude patients who were transferred out
- Exclude patients discharged directly from the ED alive
- Exclude patients with an advanced directive limiting care present prior to injury
- Exclude patients who sustain a hip fracture and fall and age \geq 65

Note: this benchmark may not match your national benchmark report exactly. The MTQIP uses AIS 2005. The national benchmark uses ICD-9 with crosswalk to AIS 1998.

Cohort 8 (Isolated Hip Fracture)

- Mechanism derived from external cause code = Fall
- Injury codes
 - AIS code =
 - 851810 (femur fracture intertrochanteric)
 - 851812 (femur fracture neck)
 - 851818 (femur fracture subtrochanteric)
 - 853111 (proximal femur fracture NFS)
 - 853112 (proximal femur fracture open NFS)
 - 853151 (proximal femur fracture trochanteric; intertrochanteric)
 - 853152 (proximal femur fracture trochanteric; intertrochanteric open)
 - 853161 (proximal femur fracture femoral neck)
 - 853162 (proximal femur fracture femoral neck open)
 - 853171 (proximal femur fracture femoral neck)
 - 853172 (proximal femur fracture femoral neck open)
 - ICD-9 code =
 - 820.22 (closed fracture of subtrochanteric section of neck of femur)
 - 820.32 (open fracture of subtrochanteric section of neck of femur)
 - ICD-10 code =
 - S72.21XA (Displaced subtrochanteric fracture of right femur, initial encounter for closed fracture)
 - S72.21XB (Displaced subtrochanteric fracture of right femur, initial encounter for open fracture type I or II)

- S72.21XC (Displaced subtrochanteric fracture of right femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
- S72.22XA (Displaced subtrochanteric fracture of left femur, initial encounter for closed fracture)
- S72.22XB (Displaced subtrochanteric fracture of left femur, initial encounter for open fracture type I or II)
- S72.22XC (Displaced subtrochanteric fracture of left femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
- S72.23XA (Displaced subtrochanteric fracture of unspecified femur, initial encounter for closed fracture)
- S72.23XB (Displaced subtrochanteric fracture of unspecified femur, initial encounter for open fracture type I or II)
- S72.23XC (Displaced subtrochanteric fracture of unspecified femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
- S72.24XA (Nondisplaced subtrochanteric fracture of right femur, initial encounter for closed fracture)
- S72.24XB (Nondisplaced subtrochanteric fracture of right femur, initial encounter for open fracture type I or II)
- S72.24XC (Nondisplaced subtrochanteric fracture of right femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
- S72.25XA (Nondisplaced subtrochanteric fracture of left femur, initial encounter for closed fracture)
- S72.25XB (Nondisplaced subtrochanteric fracture of left femur, initial encounter for open fracture type I or II)
- S72.25XC (Nondisplaced subtrochanteric fracture of left femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
- S72.26XA (Nondisplaced subtrochanteric fracture of unspecified femur, initial encounter for closed fracture)
- S72.26XB (Nondisplaced subtrochanteric fracture of unspecified femur, initial encounter for open fracture type I or II)
- S72.26XC (Nondisplaced subtrochanteric fracture of unspecified femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
- All other injuries must be in AIS external body region (i.e., bruise, abrasion or laceration)
- Age \geq 65 unless otherwise specified

Mortality or Hospice

- Mechanism = Blunt or penetrating
- Age \geq 18, Age \geq 16 starting 1/1/13

- ISS \geq 5
- Hospital LOS \geq 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Outcome is dead or discharge to hospice

ISS > 35 Mortality

- Mechanism = Blunt or penetrating
- Age \geq 18, Age \geq 16 starting 1/1/13
- ISS > 35
- Hospital LOS \geq 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Age < 65 Mortality

- Mechanism = Blunt or penetrating
- Age \geq 18, Age \geq 16 starting 1/1/13 and Age < 65
- ISS \geq 5
- Hospital LOS \geq 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Age \geq 65 Mortality

- Mechanism = Blunt or penetrating
- Age \geq 65
- ISS \geq 5
- Hospital LOS \geq 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Mortality Trend

- Cohort 2
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Complications Trend

- Cohort 2
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Complications

- Cohort 2 w/o DOA's
- Complication severity grade 1
 - Definition: Non-life-threatening complications

- Complications: superficial SSI, wound disruption, deep SSI, catheter-related bloodstream infection, catheter-associated urinary tract infection, organ/space SSI, drug or alcohol withdrawal syndrome, osteomyelitis
- Complication severity grade 2
 - Definition: Potentially life-threatening complications
 - Complications: unplanned admission to ICU, pneumonia, unplanned return to OR, DVT, decubitus ulcer, C. difficile colitis, pulmonary embolism, enterocutaneous fistula, extremity compartment syndrome
- Complication severity grade 3
 - Definition: Life-threatening complications with residual or lasting disability
 - Complications: cardiac arrest with CPR, acute kidney injury, ARDS, myocardial infarction, unplanned intubation, stroke/CVA, severe sepsis, acute renal insufficiency, mortality
- Specific complication groups
 - Any complication = Grade 1 + Grade 2 + Grade 3 (excluding death)
 - Serious = Grade 2 + Grade 3 (excluding death)
 - Cardiac/Stroke = stroke/CVA, cardiac arrest requiring CPR, myocardial infarction
 - Pneumonia = pneumonia
 - DVT/Pulmonary Embolus = DVT lower extremity, DVT upper extremity, pulmonary embolism
 - UTI = urinary tract infection
 - Renal Failure = acute kidney injury
 - Sepsis = sepsis
 - C. Difficile Colitis = C. diff

Failure to Rescue

- Mechanism = Blunt or penetrating
- Age ≥ 18 , Age ≥ 16 starting 1/1/13
- ISS ≥ 5
- Hospital LOS ≥ 1 day or dead
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Admit to trauma service if ED disposition not death
- Exclude patients who did not have a severity grade 2 or 3 complication
- Failure to rescue = $n \text{ dead with complication} / n \text{ with complication}$

Note: A patient can have four possible combinations: dead/no complication, dead/complication, alive/no complication, or alive/complication. Failure to rescue is the percent of patients with an identified complication who go on to die.

Unplanned Return to OR

- Cohort 2
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Unplanned return to OR = Y

Unplanned Return to ICU

- Cohort 2
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Unplanned return to ICU = Y

Hospital Length of Stay

- Cohort 2
- Exclude all deaths

Intensive Care Unit Length of Stay

- Cohort 2
- Exclude all deaths
- Exclude all patients with ICU LOS < 1

Patients Admitted to ICU

- Cohort 1
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- ICU days > 0

Ventilator Days

- Cohort 2
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Exclude all patients with Mechanical Ventilator Days < 1

VAP

- Cohort 2
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Exclude patients with Mechanical Ventilator Days < 1

Patients on Ventilator

- Cohort 1
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Mechanical Ventilator days > 0

IVC Filter

- Cohort 1
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

- Op Code 38.7, 06H00DZ, 06H03DZ, 06H04DZ, 06V03DZ, or 06V03ZZ

ICP Monitor and/or Brain Operation

- Cohort 1
- Mechanism = Blunt
- AIS Head ≥ 1 , excluding vascular, scalp, and bony injuries
- Exclude if TBI GCS > 8
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- Exclude patients who were transferred late (Direct admit)

Blood

- Cohort 1
- PRBC 4 hours ≥ 5 units

Hemorrhage Control Angiography/Operation

- Cohort 1
- Lowest systolic BP ≤ 90 in ED
- Exclude if first angiography/operation < 0 or > 24 hours

No Signs of Life

- Patients will be designated as having arrived at the ED with “no signs of life” if they meet one of the following criteria and die in the ED
- ED SBP 0, HR 0, and GCS 3
- ED SBP 0, HR 0, and mGCS 1
- ED SBP = NK/NR, HR 0, and mGCS 1
- ED SBP 0, HR 0, and mGCS = NK/NR
- ED SBP 0, HR = NK/NR, and mGCS 1
- ED SBP = NK/NR, HR 0, and mGCS = NK/NR