**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 ≥ 16 years old
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death

**Cohort Descriptions**

**Cohort 1 (All)**

- Mechanism = Blunt or penetrating
- Age ≥ 18, Age ≥ 16 starting 1/1/13
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death

**Cohort 1 (All) w/o DOA's**

- Mechanism = Blunt or penetrating
- Age ≥ 18, Age ≥ 16 starting 1/1/13
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

**Cohort 2 (Admit trauma)**

- Mechanism = Blunt or penetrating
- Age ≥ 18, Age ≥ 16 starting 1/1/13
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death
- Admit to trauma service if ED disposition not death

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

- Mechanism = Blunt or penetrating

- Age ≥ 18, Age ≥ 16 starting 1/1/13
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death
- 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 ≥ 18, Age ≥ 16 starting 1/1/13
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- AIS ≥ 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 ≥ 18, Age ≥ 16 starting 1/1/13
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
- AIS ≥ 3 limited to only one body region with all other body regions having a maximum AIS ≤ 2 in the following body regions: head/neck, face, chest, abdomen, extremities, or external.

**Cohort 5 (Penetrating)**

- Mechanism = Penetrating
- Age ≥ 18, Age ≥ 16 starting 1/1/13
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death
- 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 ≥ 18, Age ≥ 16 starting 1/1/13
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death
- 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 ≥ 16
- ISS ≥ 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 ≥ 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 ≥ 18, Age ≥ 16 starting 1/1/13
- ISS ≥ 5

- Transfer to another acute care hospital or in-patient observation/admission or death
- 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 ≥ 18, Age ≥ 16 starting 1/1/13
- ISS > 35
- Transfer to another acute care hospital or in-patient observation/admission or death
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

**Age < 65 Mortality**

- Mechanism = Blunt or penetrating
- Age ≥ 18, Age ≥ 16 starting 1/1/13 and Age < 65
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death
- Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

**Age ≥ 65 Mortality**

- Mechanism = Blunt or penetrating
- Age ≥ 65
- ISS ≥ 5
- Transfer to another acute care hospital or in-patient observation/admission or death
- 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
- Transfer to another acute care hospital or in-patient observation/admission or death
- 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 dead with complication / n 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