# Chapter 3. Patient Safety



## 3.1. Healthcare-Associated Infections

**Measure ID**

HCUP_ 1, 30101011

**Measure Title**

Postoperative septicemia per 1,000 elective surgical hospital discharges of 4 or more days

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Descriptions**

Geographic Representation: National, State

Years Available: National - 2008 - 2015

State - 2011 - 2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Sources**

National: AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

State: AHRQ, CDOM, HCUP, SID and AHRQ Quality Indicators, modified version 4.4

**Denominator**

All elective hospital surgical discharges among people age 18 or over with a length of stay of 4 or more days

**Numerator**

Subset of the Denominator with any secondary diagnosis of sepsis

**Comments**

The AHRQ PSI software requires that the sepsis be reported as a secondary diagnosis (rather than the principal diagnosis). But unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. In addition, the sepsis is not verifiable as following surgery. Consistent with the AHRQ PSI software, the following cases are excluded: admissions with a principal diagnosis of infection, admissions with cancer or in an immunocompromised state, and obstetric admissions. Rates prior to 2008 are not reported because of International Classification of Diseases, Ninth Revision, coding changes.

Rates are adjusted by age, gender, age-gender interactions, comorbidities, major diagnostic category (MDC), diagnosis-related group (DRG), and transfers to the hospital. When reporting is by age, the adjustment is by gender, comorbidities, MDC, DRG, and transfers to the hospital; when reporting is by gender, the adjustment is by age, comorbidities, MDC, DRG, and transfers to the hospital. The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally

weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

MPSMS_1, 30101021

**Measure Title**

Hospitalized patients who develop catheter-associated urinary tract infections (CAUTIs)

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS): In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program, MPSMS

**Denominator**

All patients from the MPSMS sample with documented placement of a urinary catheter

**Numerator**

A subset of the Denominator with the diagnosis and treatment of a catheter-associated urinary tract infection

**Comments**

Beginning with the 2004 MPSMS data, the “Post-operative UTI” measure was discontinued, and the “Catheter-Associated Urinary Tract Infection” measure was implemented in its place.

MPSMS data are abstracted from the medical record for the index hospital stay. Beginning with the 2009 MPSMS data, Medicare Eligibility and National Claims History databases were no longer applicable or available for the MPSMS sample.

**Measure ID**

HCUP_2, 30101031

**Measure Title**

Admissions with central venous catheter-related bloodstream infection per 1,000 medical and surgical discharges of length 2 or more days, age 18 and over or obstetric admissions

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Description**

Geographic Representation: National

Years Available: 2008 - 2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient’s ZIP Code, urbanized location, region of the United States, bed size of hospital

**Data Source**

AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

**Denominator**

All medical and surgical hospital discharges or obstetric admissions, age 18 and over

**Numerator**

Subset of the Denominator with any secondary diagnosis of infection

**Comments**

The AHRQ PSI software requires that the central venous catheter-related bloodstream infection be reported as a secondary diagnosis (rather than the principal diagnosis), but unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. Consistent with the AHRQ PSI software, the following cases are excluded: admissions with a diagnosis of cancer or in an immunocompromised state. Rates prior to 2008 are not reported because of International Classification of Diseases, Ninth Revision, coding changes.

Rates are adjusted by comorbidities and diagnosis-related group (DRG). The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

## 3.2. Surgical Care

**Measure ID**

MPSMS_4, 30201011

**Measure Title**

Adult surgery patients with postoperative complications (postoperative pneumonia or venous thromboembolic events)

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients from the MPSMS sample who had one or more of certain major surgical procedures identified as part of the SCIP during the index hospital stay

**Numerator**

A subset of the Denominator with a diagnosed pulmonary embolism (PE) or deep vein thrombosis (DVT) during the index hospital stay

**Comments**

MPSMS data were abstracted from the medical record for the index hospital stay. Beginning with the 2009 MPSMS data, Medicare Eligibility and National Claims History databases were no longer applicable or available for the MPSMS sample.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_3, 30201021

**Measure Title**

Hospitalized adult major surgical patients who develop postoperative pneumonia

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients from the MPSMS sample who had at least one of the selected major surgical procedures identified as part of the SCIP and did not have pneumonia prior to the procedure

**Numerator**

A subset of the Denominator with a diagnosis of and treatment for postoperative pneumonia

**Comments**

MPSMS data are abstracted from the medical record for the index hospital stay. Beginning with the 2009 MPSMS data, Medicare Eligibility and National Claims History databases were no longer applicable or available for the MPSMS sample.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_2, 30201031

**Measure Title**

Hospitalized adult surgical patients who experience postoperative pneumonia or a thromboembolic venous event(s)

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients from the MPSMS sample who had at least one of the selected major surgical procedures identified as part of the SCIP and did not have pneumonia or venous thromboembolic event(s) prior to the procedure

**Numerator**

A subset of the Denominator who developed postoperative pneumonia or venous thromboembolic event(s)

**Comments**

MPSMS data are abstracted from the medical record for the index hospital stay. Beginning with the 2009 MPSMS data Medicare Eligibility and National Claims History databases were no longer applicable or available for the MPSMS sample.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

HCUP_3, 30201041

**Measure Title**

Postoperative hemorrhage or hematoma with surgical drainage or evacuation per 1,000 surgical hospital discharges, adults

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Description**

Geographic Representation: National

Years Available: 2000 - 2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Source**

AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

**Denominator**

Inpatient hospital surgical discharges age 18 and over, excluding obstetric

Population measure: U.S. resident population age 18 and over

**Numerator**

Subset of the Denominator with a secondary diagnosis indicating postoperative hemorrhage or postoperative hematoma

**Comments**

The AHRQ PSI software requires that the hemorrhage or hematoma complicating procedure be reported as a secondary diagnosis (rather than the principal diagnosis), but unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. In addition, the control of the hemorrhage or hematoma is not verifiable as following surgery. Consistent with the AHRQ PSI

software, the following cases are excluded: obstetric conditions and admissions in which the control of the hemorrhage or hematoma is the only operating room procedure.

Rates are adjusted by gender, comorbidities, major diagnostic category (MDC), diagnosis-related group (DRG), and transfers to the hospital. When reporting is by gender, the adjustment is by comorbidities, MDC, DRG, and transfers to the hospital. The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_4, 30201051

**Measure Title**

Postoperative pulmonary embolism (PE) or deep vein thrombosis (DVT) per 1,000 surgical hospital discharges

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Description**

Geographic Representation: National

Years Available: 2005 - 2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Sources**

AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

**Denominator**

Inpatient hospital surgical discharges age 18 and over, excluding patients admitted for deep vein thrombosis or pulmonary embolism, obstetric admissions, and patients with secondary procedures for interruption of vena cava before or after surgery or as the only procedure

**Numerator**

Subset of the Denominator with any secondary diagnosis of PE or DVT

**Comments**

The AHRQ PSI software requires that the PE or DVT be reported as a secondary diagnosis (rather than the principal diagnosis), but unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. In addition, the interruption of vena cava is not verifiable as following surgery. Consistent with the AHRQ PSI software, the following cases are excluded: obstetric conditions and admissions in which the interruption of vena cava is the only operating

room procedure. Rates prior to 2005 are not reported because of International Classification of Diseases, Ninth Revision coding changes.

Rates are adjusted by age, comorbidities, major diagnostic category (MDC), diagnosis-related group (DRG), and transfers to the hospital. When reporting is by age, the adjustment is by comorbidities, MDC, DRG, and transfers to the hospital. The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_5, 30201061

**Measure Title**

Postoperative respiratory failure per 1,000 elective surgical hospital discharges, adults

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs) and Pediatric Quality Indicators (PDIs)

**Table Description**

Geographic Representation: National

Years Available: 2000 - 2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Source**

AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

**Denominator**

All elective hospital surgical discharges (age 18 and over), excluding patients with respiratory disease, circulatory disease, neuromuscular disorders, obstetric conditions, and secondary procedure of tracheostomy before or after surgery or as the only procedure

**Numerator**

Subset of the Denominator with any secondary diagnosis of acute respiratory failure or reintubation procedure at specific postoperative intervals

**Comments**

The AHRQ PSI and PDI software require that the respiratory failure be reported as a secondary diagnosis (rather than the principal diagnosis), but unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. In addition, the tracheostomy is not verifiable as following surgery. Consistent with the AHRQ PSI and PDI software, the following cases are excluded: admissions with respiratory disease, circulatory disease, craniofacial anomalies, or neuromuscular disorders; obstetric admissions; admissions in which the tracheostomy is the only

operating room procedure; and admissions with a procedure for esophageal resection, lung cancer, or the nose, mouth, and pharynx. In addition, the PDI software excludes neonates with birth weight less than 500 grams.

Rates are adjusted by age, gender, age-gender interactions, comorbidities, major diagnostic category (MDC), diagnosis-related group (DRG), and transfers to the hospital. When reporting is by age, the adjustment is by gender, comorbidities, MDC, DRG, and transfers to the hospital; when reporting is by gender, the adjustment is by age, comorbidities, MDC, DRG, and transfers to the hospital. The AHRQ PSI and PDI software were modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_6, 30201081

**Measure Title**

Postoperative physiologic/metabolic derangements per 1,000 elective surgical hospital discharges

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Organization, Delivery, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Description**

Geographic Representation: National

Years Available: 2000 - 2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Source**

AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

**Denominator**

All elective hospital surgical discharges for people age 18 and over, excluding those with selected serious diseases (see Comments) and obstetric admissions

**Numerator**

Subset of the Denominator with any secondary diagnosis indicating physiologic and metabolic derangements; discharges with acute renal failure must be accompanied by a procedure code for dialysis.

**Comments**

The AHRQ PSI software requires that the physiologic and metabolic derangements be reported as a secondary diagnosis (rather than the principal diagnosis), but unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. In addition, the derangement is not verifiable as following surgery. Consistent with the AHRQ PSI software, the following cases are excluded: obstetric admissions and admissions for ketoacidosis, hyperosmolarity, and

diabetic coma; admissions with acute renal failure, acute myocardial infarction, cardiac arrhythmia, cardiac arrest, shock, hemorrhage, gastrointestinal hemorrhage, or chronic renal failure.

Rates are adjusted by age, gender, age-gender interactions, comorbidities, major diagnostic category (MDC), and diagnosis-related group (DRG). When reporting is by age, the adjustment is by gender, comorbidities, MDC, and DRG; when reporting is by gender, the adjustment is by age, comorbidities, MDC, and DRG. The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_7, 30201091

**Measure Title**

Postoperative hip fractures per 1,000 surgical admissions

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Description**

Geographic Representation: National

Years Available: 2000 - 2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Source**

AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

**Denominator**

Inpatient hospital surgical discharges, age 18 and over, who were not susceptible to falling

**Numerator**

Subset of the Denominator with any secondary diagnosis indicating hip fracture

**Comments**

The AHRQ PSI software requires that the hip fracture be reported as a secondary diagnosis (rather than the principal diagnosis), but unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. In addition, the hip fracture repair is not verifiable as following surgery. Consistent with the AHRQ PSI software, the following cases are excluded:

- Obstetric cases;
- Admissions for seizure, syncope, stroke, coma, cardiac arrest, poisoning, trauma, delirium and other psychoses, anoxic brain injury, metastatic cancer, lymphoid/bone malignancy, or self-inflicted injury;

- Admissions for diseases and disorders of the musculoskeletal system and connective tissue; and
- Admissions in which hip fracture repair is the only operating room procedure.

Rates are adjusted by major diagnostic category (MDC). The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_8, 30201101

**Measure Title**

Reclosure of postoperative abdominal wound dehiscence per 1,000 abdominopelvic-surgery admissions of length 2 or more days, adults

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Descriptions**

Geographic Representation: National, States

Years Available: National - 2000 – 2015; State - 2011 - 2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Source**

National: AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

State: AHRQ, CDOM, HCUP, State Inpatient Databases (SID) and AHRQ Quality Indicators, modified version 4.4

**Denominator**

Inpatient hospital surgical (abdominopelvic surgery with a length of stay of 2 or more days) discharges age 18 and over, excluding obstetric admissions

**Numerator**

Subset of the Denominator with a secondary procedure indicating reclosure of postoperative disruption of abdominal wall

Population measure: Subset of the Denominator with any procedure indicating reclosure of postoperative disruption of abdominal wall

## Comments

Reclosure of abdominal wound dehiscence is not verifiable as following surgery and may have occurred on or before the abdominopelvic procedure. Consistent with the AHRQ PSI software, the following cases are excluded: obstetric admissions and admissions in an immunocompromised state.

Rates are adjusted by age, gender, age-gender interactions, comorbidities, major diagnostic category (MDC), and diagnosis-related group (DRG). When reporting is by age, the adjustment is by gender, comorbidities, MDC, and DRG; when reporting is by gender, the adjustment is by age, comorbidities, MDC, and DRG. The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

MPSMS_5, 30201111

**Measure Title**

Hospitalized adult patients who develop postoperative adverse events associated with hip joint replacement due to degenerative conditions

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups

Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients in the MPSMS sample who had a surgical procedure performed (defined by procedure code 81.51 in ICD9 or corresponding ICD10 codes) to replace a hip joint due to degenerative conditions

**Numerator**

A subset of the Denominator who experienced at least one of the following:

- Postoperative infection (acute or early deep), dehiscence, necrosis, hematoma, nerve injury, major bleeding, dislocation, cardiovascular complications, catheter-associated urinary tract infection or pneumonia.
- Return to operating room after procedure (excludes same side revision).
- Revision during the index hospital stay (same side as index procedure).
- Periprosthetic fracture.
- Postoperative venous thromboembolic event during hospital stay.

**Comments**

Postoperative infections are determined by documentation of early prosthetic joint or wound infection or acute and early deep hip infection, excluding superficial infection. Wound complications other than infection include dehiscence, hematoma, and necrosis. Cardiovascular complications include myocardial infarction, congestive heart failure, and arrhythmia requiring treatment.

MPSMS data are abstracted from the medical record for the index hospital stay. Beginning with the 2009 MPSMS data, Medicare Eligibility and National Claims History databases were no longer applicable or available for the MPSMS sample.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_6, 30201121

**Measure Title**

Hospitalized adult surgical patients who develop postoperative adverse events associated with hip joint replacement due to fracture

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

Patients in the MPSMS sample who had a surgical procedure performed (defined by procedure code 81.52 in ICD9 or corresponding ICD 10 codes) to replace a fractured hip joint

**Numerator**

Subset of the Denominator who experienced at least one of the following:

- Postoperative infections (acute or early deep), dehiscence, necrosis, hematoma, nerve injury, major bleeding, dislocation, cardiovascular complications, catheter-associated urinary tract infection or pneumonia.
- Return to operating room after procedure (excludes same side revision).
- Revision during the index hospital stay (same side as index procedure).
- Periprosthetic fracture.
- Postoperative venous thromboembolic event during hospital stay.

**Comments**

Postoperative infections are determined by documentation of early prosthetic joint or wound infection or acute and early deep hip infection, excluding superficial infection. Wound complications other than infection include dehiscence, hematoma, and necrosis.

Cardiovascular complications include myocardial infarction, congestive heart failure, and arrhythmia requiring treatment.

MPSMS data are abstracted from the medical record for the index hospital stay. Beginning with the 2009 MPSMS data, Medicare Eligibility and National Claims History databases were no longer applicable or available for the MPSMS sample.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_7, 30201131

**Measure Title**

Hospitalized adult surgical patients who develop postoperative adverse events associated with hip joint replacement due to fracture or degenerative conditions

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients in the MPSMS sample who had a surgical procedure performed to replace a hip joint due to degenerative conditions (defined by procedure code 81.51 in ICD9 or corresponding codes in ICD10) or a fractured hip (defined by procedure code 81.52 in ICD9 or corresponding codes in ICD10)

**Numerator**

A subset of the Denominator who experienced at least one of the following:

- Postoperative infections (acute or early deep), dehiscence, necrosis, hematoma, nerve injury, major bleeding, dislocation, cardiovascular complications, catheter-associated urinary tract infection or pneumonia.
- Return to operating room after procedure (excludes same side revision).
- Revision during the index hospital stay (same side as index procedure).
- Periprosthetic fracture.
- Postoperative venous thromboembolic event during hospital stay.

**Comments**

Postoperative infections are determined by documentation of early prosthetic joint or wound infection or acute and early deep hip infection, excluding superficial infection. Wound complications other than infection include dehiscence, hematoma, and necrosis. Cardiovascular complications include myocardial infarction, congestive heart failure, and arrhythmia requiring treatment.

MPSMS data are abstracted from the medical record for the index hospital stay. Beginning with the 2009 MPSMS data Medicare Eligibility and National Claims History databases were no longer applicable or available for the MPSMS sample.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_8, 30201141

**Measure Title**

Hospitalized adult surgical patients who develop postoperative adverse events associated with knee joint replacement

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients in the MPSMS sample who undergo a knee joint replacement (defined by procedure code 81.54 in ICD9 or corresponding codes in ICD10)

**Numerator**

A subset of the Denominator who experienced at least one of the following:

- Postoperative infections (acute or early deep), dehiscence, necrosis, hematoma, nerve injury, major bleeding, dislocation, cardiovascular complications, catheter-associated urinary tract infection or pneumonia.
- Periprosthetic fracture.
- Return to operating room after procedure (excludes same side revision).
- Revision during the index hospital stay (same side as index procedure).
- Postoperative venous thromboembolic event during hospital stay.

**Comments**

Postoperative infections are determined by documentation of early prosthetic joint or wound infection or acute and early deep knee infection, excluding superficial infection. Wound

complications other than infection include dehiscence, hematoma, and necrosis. Cardiovascular complications include myocardial infarction, congestive heart failure, and arrhythmia requiring treatment.

MPSMS data are abstracted from the medical record for the index hospital stay. Beginning with the 2009 MPSMS data, Medicare Eligibility and National Claims History databases were no longer applicable or available for the MPSMS sample.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

## 3.3. Other Complications of Hospital Care

**Measure ID**

MPSMS_9, 30301011

**Measure Title**

Composite measure: Central line-associated bloodstream infections (CLABSIs) or mechanical adverse events per 1,000 patients who had a central line placed during the index hospital stay

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients from the MPSMS sample with documentation of placement of at least one vascular access device terminating at, or close to, the heart in one of the central vessels, who do not have an infection on admission. The following are considered central veins for this measure: aorta; vena cava; brachiocephalic veins; iliac vein; internal jugular veins; and subclavian veins. Pulmonary artery catheters (Swan-Ganz catheters) are included in this measure.

**Numerator**

Subset of the Denominator who develop a central line-associated bloodstream infection, or experience a central line-associated mechanical adverse event

**Comments**

In order for a blood stream infection (BSI) to be associated with a central line, the patient did not have an infection on admission, had no other source of infection, and had the first central line in place for at least two days prior to a positive blood culture for a BSI pathogen* (as determined by expert review).

*****Note: At least two positive cultures are required to count "coagulase negative Staphylococcus," "Staphylococcus epidermidis," "Staphylococcus not otherwise specified," and "Staphylococcus other" as a BSI.

Central line-associated mechanical adverse event is determined by documentation of:

- An allergic reaction (only when CPR is administered within 15 minutes of catheter insertion).
- Arrhythmia.
- Perforation.
- Pneumothorax.
- Hematoma/bleeding.
- Shearing off of catheter.
- Air embolism.
- Misplaced catheter.
- Thrombosis/embolism.
- Knotting of pulmonary artery catheter.
- Catheter occlusion.
- Leaking.
- Others as determined by review of clinical expert.

MPSMS data are abstracted from the medical record for the index hospital stay.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_10, 30301021

**Measure Title**

Bloodstream infection in adult patients receiving central venous catheter placement

Hospitalized adult patients with central line-associated bloodstream infections (CLABSIs)

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients from the MPSMS sample with documentation of placement of at least one vascular access device terminating at, or close to, the heart in one of the central vessels, who do not have an infection on admission. The following are considered central veins for this measure: aorta; vena cava; brachiocephalic veins; iliac vein; internal jugular veins; subclavian veins. Pulmonary artery catheters (Swan-Ganz catheters) are included in this measure.

**Numerator**

A subset of the Denominator with a central line-associated bloodstream infections

**Comments**

In order for a blood stream infection ( BSI) to be associated with a central line, the patient did not have an infection on admission, had no other source of infection, and had the first central line in place for at least two days prior to a positive blood culture for a BSI pathogen* (as determined by expert review).

* At least two positive cultures are required for Coagulase-negative staphylococci, *Staphylococcus* epidermis, *Staphylococcus* not otherwise specified, *Staphylococcus* other.

MPSMS data are abstracted from the medical record for the index hospital stay. In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_11, 30301031

**Measure Title**

Mechanical adverse events in adult patients receiving central line placement

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All Medicare fee-for-service (FFS) discharges from the MPSMS sample with placement of at least one vascular access device terminating at, or close to, the heart or in one of the great vessels The following are considered great vessels for this measure: aorta, vena cava, brachiocephalic vein, iliac vein, internal jugular vein, and subclavian vein.

**Numerator**

Subset of the Denominator with central line associated mechanical adverse events. A central-line -associated mechanical adverse event is defined as the presence in the medical record of at least one of the following:

- Allergic reaction (only when CPR is performed within 15 minutes).
- Perforation.
- Pneumothorax.
- Hematoma.
- Shearing off of the catheter.
- Air embolism.
- Misplaced catheter.
- Thrombosis/embolism.
- Knotting of the pulmonary artery catheter.
- Bleeding.
- Catheter occlusion.
- Leaking.
- Other.

**Comments**

MPSMS is a nationwide surveillance system designed to identify rates of specific adverse events within the hospitalized Medicare FFS population. An adverse event is defined as an unintended patient harm, injury, or loss more likely associated with the patient's interaction with the health care delivery system than from diseases the patient may have.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

HCUP_9, 30301041

**Measure Title**

Accidental puncture or laceration during procedure per 1,000 medical and surgical admissions, adults

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Description**

Geographic Representation: National

Years Available: 2000 - 2015

Population Subgroups: Age, bed size (hospital), gender, expected primary payer, geographic location (hospital and residence), income, ownership of hospital, region, teaching status of hospital

**Data Source**

National: AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

**Denominator**

Hospital medical and surgical admissions among adults age 18 and over, excluding obstetric admissions

**Numerator**

Subset of the Denominator with secondary diagnosis denoting accidental cut, puncture, perforation, or laceration during a procedure

**Comments**

The AHRQ PSI software requires that the accidental puncture or laceration be reported as a secondary diagnosis (rather than the principal diagnosis), but unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. Consistent with the AHRQ PSI software, the following cases are excluded: obstetric admissions and admissions involving spinal surgery.

Rates are adjusted by age, gender, age-gender interactions, comorbidities, major diagnostic category (MDC), diagnosis-related group (DRG), and transfers to the hospital. When reporting is by age, the adjustment is by gender, comorbidities, MDC, DRG, and transfers to the hospital; when reporting is by gender, the adjustment is by age, comorbidities, MDC, DRG, and transfers to the hospital. The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_58, 30301051

**Measure Title**

Accidental puncture or laceration during procedure per 1,000 medical and surgical admissions, children

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Pediatric Quality Indicators (PDIs)

**Table Description**

Geographic Representation: National

Years Available: 2000-2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Source**

AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

**Denominator**

Hospital medical and surgical discharges among children age less than 18 years, excluding obstetric admissions

**Numerator**

Subset of the Denominator with secondary diagnosis denoting accidental cut, puncture, perforation, or laceration during a procedure

**Comments**

The AHRQ PDI software requires that the accidental puncture or laceration be reported as a secondary diagnosis (rather than the principal diagnosis), but unlike the AHRQ PDI software, the secondary diagnosis could be present on admission. Consistent with the AHRQ PDI software, the following cases are excluded: obstetric admissions, admissions involving spinal surgery, normal newborns, and neonates with a birth weight less than 500 grams.

Rates are adjusted by Major Diagnostic Category (MDC) and type of therapeutic procedure. The AHRQ PDI software was modified to not use the present on admission (POA) indicators (nor estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_10, 30301061

**Measure Title**

Hospital admissions with iatrogenic pneumothorax per 1,000 medical and surgical admissions, adults

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Descriptions**

Geographic Representation: National, State

Years Available: National - 2000 – 2015; State - 2011-2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Sources**

National: AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

State: National: AHRQ, CDOM, HCUP, State Inpatient Databases (SID) and AHRQ Quality Indicators, modified version 4.4

**Denominator**

All medical and surgical hospital discharges, age 18 and over, excluding patients with chest trauma or pleural effusion, thoracic surgery, lung or pleural biopsy, cardiac surgery, diaphragmatic surgery, or obstetric admissions

**Numerator**

Subset of the Denominator with any secondary diagnosis of iatrogenic pneumothorax

**Comments**

The AHRQ PSI software requires that the iatrogenic pneumothorax be reported as a secondary diagnosis (rather than the principal diagnosis), but unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. Consistent with the AHRQ PSI software, the following

cases are excluded: obstetric admissions and admissions with chest trauma, pleural effusion, thoracic surgery, lung/pleural biopsy, diaphragmatic surgery repair, or cardiac surgery.

Rates are adjusted by age, gender, age-gender interactions, comorbidities, major diagnostic category (MDC), and diagnosis-related group (DRG). When reporting is by age, the adjustment is by gender, comorbidities, MDC, and DRG; when reporting is by gender, the adjustment is by age, comorbidities, MDC, and DRG. The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

Although not all States participate in the HCUP database, NIS is weighted to give national estimates using weights based on all U.S. community, non-rehabilitation hospitals in the American Hospital Association Annual Survey Database.

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_11, 30301071

**Measure Title**

Deaths per 1,000 elective-surgery admissions having developed specified complications of care during hospitalization, ages 18-89 or obstetric admissions

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Descriptions**

Geographic Representation: National, State

Years Available: National - 2005 – 2015; State - 2011-2015

Population Subgroups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Sources**

National: AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

State: AHRQ, CDOM, HCUP, State Inpatient Databases (SID) and AHRQ Quality Indicators, modified version 4.4

**Denominator**

Hospital inpatient discharges, ages 18-89 years, with potential complications of care, excluding patients transferred in or out or patients admitted from long-term-care facilities

**Numerator**

Subset of the Denominator with discharge disposition indicating death

**Comments**

Consistent with the AHRQ PSI software, complications of care include acute renal failure, pneumonia, pulmonary embolism, deep vein thrombosis, sepsis, shock, cardiac arrest, gastrointestinal hemorrhage, and acute ulcer with transfers to another hospital excluded. The AHRQ PSI software requires that the complication be reported as a secondary diagnosis (rather

than the principal diagnosis), but unlike the AHRQ PSI software, the secondary diagnosis could be present on admission. Rates prior to 2005 are not reported because of International Classification of Diseases, Ninth Revision, coding changes.

Rates are adjusted by age, comorbidities, major diagnostic category (MDC), diagnosis-related group (DRG), and transfers to the hospital. When reporting is by age, the adjustment is by comorbidities, MDC, DRG, and transfers to the hospital. The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_12, 30301081

**Measure Title**

Deaths per 1,000 discharges in low-mortality diagnosis-related groups (DRGs)

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Descriptions**

Geographic Representation: National, State

Years Available: National - 2000 – 2015; State - 2011-2015

Population sub groups: Age, gender, race/ethnicity, expected primary payer, median household income of the patient's ZIP Code, urbanized location, region of the United States, bed size of hospital, teaching status of hospital

**Data Source**

National: AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

State: AHRQ, CDOM, HCUP, State Inpatient Databases (SID) and AHRQ Quality Indicators, modified version 4.4

**Denominator**

Hospital admissions among people age 18 and over or obstetric conditions, in low-mortality DRGs (defined as DRGs with less than a 05% mortality rate), excluding patients with trauma, immunocompromised state, or cancer

**Numerator**

Subset of the Denominator with discharge disposition indicating death

**Comments**

Consistent with the AHRQ PSI software, admissions with expected low mortality are identified by Medicare Severity DRG or DRG, depending on the date of discharge. Exclusions include admissions with cancer, admissions in an immunocompromised state, and admissions involving a traumatic injury. Low-mortality DRGs are defined as DRGs with less than a 0.5% mortality

rate, such as cesarean section without complications, major male pelvic procedures, and syncope and collapse.

Rates are adjusted by age, gender, age-gender interactions, comorbidities, DRG, and transfers to the hospital. When reporting is by age, the adjustment is by gender, comorbidities, DRG, and transfers to the hospital; when reporting is by gender, the adjustment is by age, comorbidities, DRG, and transfers to the hospital. The AHRQ PSI software was modified to not use the present on admission (POA) indicators (or estimates of the likelihood of POA for secondary diagnosis).

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

## 3.4. Complications of Medication

**Measure ID**

MPSMS_12, 30401011

**Measure Title**

Hospitalized adult patients who have an adverse event associated with the anticoagulant warfarin

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients from the MPSMS sample who received warfarin during hospitalization and had a documented international normalized ratio (INR) result during the index hospital stay

**Numerator**

A subset of the Denominator who during the hospital-stay experienced:

- INR ≥4.0 with one or more of the following: cardiac arrest/emergency measures to sustain life, death, gastrointestinal bleeding, genitourinary bleeding, hematocrit drop of 3 or more points more than 48 hours after admission, intracranial bleeding (subdural hematoma), new hematoma, other types of bleeding, or pulmonary bleeding.
- INR >1.5 and an abrupt cessation/hold of warfarin with one or more of the above symptoms.
- INR >1.5 and administration of vitamin K or fresh frozen plasma with one or more of the above symptoms.
- INR >1.5 and a blood transfusion absent a surgical procedure with one or more of the above symptoms.

**Comments**

The above symptoms are counted as adverse events only when they occur within two days prior to two days after the INR> 4.0, abrupt cessation/ hold of warfarin, administration of vitamin K or fresh frozen plasma or blood transfusion absent a surgical procedure.

MPSMS data are abstracted from the medical record for the index hospital stays. In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_13, 30401021

**Measure Title**

Hospitalized adult patients who have an adverse event associated with intravenous (IV) heparin

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients from the MPSMS sample who received IV heparin during hospitalization and had a documented partial thromboplastin time (PTT) result during the hospital stay

**Numerator**

A subset of the Denominator who experienced:

- PTT ≥100 with one or more of the following: cardiac arrest/emergency measures to sustain life, death, gastrointestinal bleeding, genitourinary bleeding, hematocrit drop of 3 or more points more than 48 hours after admission, intracranial bleeding (subdural hematoma), new hematoma, other types of bleeding, or pulmonary bleeding.

- PTT >45 and an abrupt cessation/hold of IV heparin with one or more of the above symptoms.
- PTT >45 and administration of protamine or fresh frozen plasma with one or more of the above symptoms.
- PTT >45 and a blood transfusion (absent a surgical procedure) with one or more of the above symptoms.

**Comments**

Not included are PTTs ≥100, PTTs >45, and an abrupt cessation/hold of IV heparin, PTTs >45 and administration of Vitamin K or fresh frozen plasma, and PTTs >45 and a blood transfusion (absent a surgical procedure) that occur the date of arrival.

MPSMS data are abstracted from the medical record for the index hospital stays. In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_14, 30401031

**Measure Title**

Hospitalized adult patients who have an adverse event associated with low-molecular-weight heparin (LMWH) or factor Xa inhibitor

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients from the MPSMS sample who received LMWH or factor Xa inhibitor during the index hospital stay

**Numerator**

A subset of the Denominator who experienced:

- Abrupt cessation/hold of LMWH or factor Xa with one of the following:
    - Cardiac arrest/emergency measures to sustain life,
    - Death,
    - Gastrointestinal bleeding,
    - Genitourinary bleeding,
    - Hematocrit drop of three or more points more than 48 hours after admission,
    - Intracranial bleeding (subdural hematoma),
    - New hematoma,
    - Other types of bleeding, or
    - Pulmonary bleeding or death.
- Administration of protamine or fresh frozen plasma (FFP) with one or more of the above symptoms.
- Blood transfusion (absent a surgical procedure) with one or more of the above symptoms.

**Comments**

Not counted in this measure are abrupt cessation/holds of LMWH or factor Xa, administration of Vitamin K or FFP, and blood transfusions (absent a surgical procedure) that occur on the date of arrival.

MPSMS data are abstracted from the medical record for the index hospital stays.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

**Measure ID**

MPSMS_15, 30401041

**Measure Title**

Hospitalized adult patients who have an adverse event associated with a hypoglycemic agent

**Measure Source**

The Medicare Patient Safety Monitoring System (MPSMS)

**Table Description**

Geographic Representation: National

Years Available: 2009-2015

Population Subgroups: Age, CHF/pulmonary edema, COPD, cerebrovascular disease, coronary artery disease, corticosteroids, diabetes, gender, obesity, race/ethnicity, renal disease, smoking

**Data Source**

CMS Inpatient Quality Reporting (IQR) Program, formerly referred to as the CMS Reporting Hospital Quality Data for Annual Payment Update Program (RHQDAPU), MPSMS

**Denominator**

All patients from the MPSMS sample who received insulin, oral hypoglycemics, or both, and had glucose result during the hospital stay

**Numerator**

A subset of the Denominator who experienced a glucose level ≤70 with one or more of the following adverse events documented on the day of the serum glucose:

- Administration of D50,
- Administration of glucagon,
- Administration of juice or sugar,
- Anxiety,
- Code blue (CPR),
- Confusion,
- Death,
- Drowsiness,
- Sweating,
- Weakness,
- Trembling,
- Increased heart rate,
- Irritability,
- Seizure,
- Stroke,
- Transient ischemic attack,
- Myocardial infarction, and
- Coma/loss of consciousness or death.

**Comments**

MPSMS data are abstracted from the medical record for the index hospital stays.

In 2009, the lead agency for MPSMS transitioned from the Centers for Medicare & Medicaid Services (CMS) to the Agency for Healthcare Research and Quality (AHRQ).

## 3.5. Birth-Related Complications

**Measure ID**

HCUP_40, 30501011

**Measure Title**

Birth trauma - injury to neonate per 1,000 selected live births

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Descriptions**

Geographic Representation: National, State

Years Available: National -2004 to 2015; State - 2011-2015

Population Subgroups: Gender, race/ethnicity, bed size of hospital, expected primary payer, location of hospital, location of residence, median income of patient's ZIP code, control of hospital, region, teaching status

**Data Sources:**

National: AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4.

State: AHRQ, CDOM, HCUP, State Inpatient Databases (SID) and AHRQ Quality Indicators, modified version 4.4

**National Denominator**

All newborns

**National Numerator**

Subset of the Denominator with any diagnosis of birth trauma, excluding preterm infants with a birth weight less than 2,000 grams, infants with any diagnosis of injury to brachial plexus, and infants with any diagnosis code of osteogenesis imperfecta

**Comments**

Rates prior to 2004 are not reported because of International Classification of Diseases, Ninth Revision coding changes.

Estimates are observed rates and are not adjusted for gender or severity.

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_41, 30501021

**Measure Title**

Obstetric trauma per 1,000 vaginal deliveries without instrument assistance

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Descriptions**

Geographic Representation: National, State

Years Available: National - 2000-2015; State - 2011-2015

Population Subgroups: Age, race/ethnicity, bed size of hospital, expected primary payer, location of hospital, location of residence, median income of patient's ZIP code, control of hospital, region, teaching status of hospital

**Data Sources**

National: AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

State: AHRQ, CDOM, HCUP, State Inpatient Databases (SID) and AHRQ Quality Indicators, modified version 4.4

**Denominator**

All hospital discharges with a diagnosis of vaginal delivery without instrument assistance

**Numerator**

Subset of the Denominator with any diagnosis or procedure indicating obstetric trauma with 3rd or 4th degree lacerations

**Comments**

Rates are adjusted by age using U.S. hospitalizations for 2010 as the standard population. When reporting is by age, there is no adjustment.

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID

encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

**Measure ID**

HCUP_42, 30501031

**Measure Title**

Obstetric trauma per 1,000 instrument-assisted deliveries

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets (CDOM), Healthcare Cost and Utilization Project (HCUP), Patient Safety Indicators (PSIs)

**Table Descriptions**

Geographic Representation: National, State

Years Available: National - 2000-2015; State - 2011-2015

Population Subgroups: Age, race/ethnicity, bed size of hospital, expected primary payer, location of hospital, location of residence, median income of patient's ZIP code, control of hospital, region, teaching status of hospital

**Data Sources**

National: AHRQ, CDOM, HCUP, Nationwide Inpatient Sample (NIS), State Inpatient Databases (SID) weighted to provide national estimates using the same methodology as the NIS prior to 2012, and AHRQ Quality Indicators, modified version 4.4

State: AHRQ, CDOM, HCUP, State Inpatient Databases (SID) and AHRQ Quality Indicators, modified version 4.4

**Denominator**

All instrument-assisted vaginal deliveries discharged from hospital

**Numerator**

Subset of the Denominator with any diagnosis or procedure indicating obstetric trauma with 3rd or 4th degree lacerations

**Comments**

Rates are adjusted by age using U.S. hospitalizations for 2010 as the standard population. When reporting is by age, there is no adjustment.

The HCUP State Inpatient Databases (SID) include a powerful set of hospital databases from HCUP Partner organizations in 47 States and the District of Columbia. Together, the SID

encompasses about 97 percent of all U.S. community hospital discharges. SID contains a core set of clinical and nonclinical information on all patients, regardless of payer, including people covered by Medicare, Medicaid, and private insurance, as well as uninsured people. In addition to the core set of uniform data elements common to all SID, some databases within SID include other elements, such as the patient's race. The SID are used to create the HCUP National (Nationwide) Inpatient Sample.

For national QI estimates prior to 2012, the HCUP Nationwide Inpatient Sample (NIS) was used to calculate national QI estimates for all level of reporting except by race/ethnicity. The NIS was not used for reporting QI estimates by race/ethnicity because the availability of race/ethnicity information varied across States and hospitals within States. In addition, the 20 percent sample of the hospitals in the NIS did not provide enough statistical power to detect differences in QI estimates between whites and the other specific racial groups. To facilitate analyses by race/ethnicity, a separate nationally weighted analysis file was constructed from the SID and hospitals with good reporting of race/ethnicity using a sampling and weighting strategy similar to the NIS.

For national QI estimates for data years 2012 forward, the HCUP National Inpatient Sample (NIS) was not used because the database had been redesigned into a sample of discharges (instead of hospitals) with a revised definition for the target universe that excluded acute long-term care facilities. For consistent QI estimates before and after data year 2012, nationally weighted analysis files were constructed from the SID using a sampling and weighting strategy similar to the 2000-2011 NIS. In 2012, two analysis files were constructed, one for national estimates not reported by race/ethnicity and a second for reporting by race/ethnicity. In 2013 and 2014, only one nationally weighted analysis file was created.

For more information on the sampling approach and included States by data year, see the HCUP Methods Series Report on Methods Applying AHRQ Quality Indicators to HCUP Data (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).

## 3.6. Inappropriate Treatment

**Measure ID**

MEPS_38, 30601011

**Measure Title**

Adults age 65 and over who received in the calendar year at least 1 of 11 prescription medications that should be avoided in older adults

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Financing, Access, and Cost Trends (CFACT), Medical Expenditure Panel Survey (MEPS)

**Table Description**

Geographic Representation: National

Years Available: 2002 to 2015

Population Subgroups: Age, gender, race, ethnicity, family income, education, employment status, health insurance, Medicaid/CHIP, residence location, language spoken at home, perceived health status, activity limitations, number of chronic conditions, U.S. born.

**Data Source**

AHRQ, CFACT, MEPS

**Denominator**

U.S. civilian noninstitutionalized population age 65 and over

**Numerator**

Subset of the Denominator who received at least 1 of the 11 medications that are potentially inappropriate for older adults

**Comments**

Prescription medications received include all prescribed medications initially purchased or otherwise obtained during the calendar year, as well as any refills. For additional information concerning potentially inappropriate medications, refer to:

Zhan C, Sangl J, Bierman AS, et al. Potentially inappropriate medication use in the community-dwelling elderly: findings from 1996 Medical Expenditure Panel Survey. *JAMA* 2001; 286(22):2823-29.

**Measure ID**

MEPS_39, 30601021

**Measure Title**

Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults

**Measure Source**

Agency for Healthcare Research and Quality (AHRQ), Center for Financing, Access, and Cost Trends (CFACT), Medical Expenditure Panel Survey (MEPS)

**Table Description**

Geographic Representation: National

Years Available: 2002 to 2015

Population Subgroups: Age, gender, race, ethnicity, family income, education, employment status, health insurance, Medicaid/CHIP, residence location, language spoken at home, perceived health status, activity limitations, number of chronic conditions, U.S. born.

**Data Source**

AHRQ, CFACT, MEPS

**Denominator**

U.S. civilian noninstitutionalized population age 65 and over

**Numerator**

Subset of the Denominator who received who received 1 or more of the 33 potentially inappropriate medications

**Comments**

Prescription medications received include all prescribed medications initially purchased or otherwise obtained during the calendar year, as well as any refills

For additional information concerning potentially inappropriate medications, refer to:

Zhan C, Sangl J, Bierman AS, et al. Potentially inappropriate medication use in the community-dwelling elderly: findings from 1996 Medical Expenditure Panel Survey. *JAMA* 2001; 286(22):2823-29.

## 3.7. Supportive and Palliative Care

No measure are included in the 2017 report because the source data are not available.

## 3.8. Home Health Communication

**Measure ID**

HHCAHPS_2, 30801021

**Measure Title**

Adults who reported a home health provider talking with them about how to set up their home so they can move around safely when they first started getting home health care

**Measure Source**

Centers for Medicare & Medicaid Services (CMS), Home Health Consumer Assessment of Healthcare Providers and Systems (HHCAHPS).

**Table Descriptions**

Geographic Representation: National, State

Years Available: 2012-2016

Population Subgroups: Age, ethnicity/race, education, language spoken at home

**Data Source**

CMS, HHCAHPS

**Denominator**

Adult home health patients age 18 and over who provided a valid response to the question, "When you first started getting home health care from this agency, did someone from the agency talk with you about how to set up your home so you can move around safely?", excluding nonrespondents and respondents indicating "do not remember."

**Numerator**

Subset of the Denominator who responded "yes" to the above question.

**Measure ID**

HHCAHPS_3, 30801031

**Measure Title**

Percent of adults who reported a home health provider talking with them about all the prescription and over-the-counter medicines you were taking, when they first started getting home health care

**Measure Source**

Centers for Medicare & Medicaid Services (CMS), Home Health Consumer Assessment of Healthcare Providers and Systems (HHCAHPS).

**Table Descriptions**

Geographic Representation: National, State

Years Available: 2012-2016

Population Subgroups: Age, ethnicity/race, education, language spoken at home

**Data Source**

CMS, HHCAHPS

**Denominator**

Adult home health patients age 18 and over who provided a valid response to the question, "When you first started getting home health care from this agency, did someone from the agency talk with you about all the prescription and over-the-counter medicines you were taking?", excluding nonrespondents and respondents indicating "do not remember."

**Numerator**

Subset of the Denominator who responded "yes" to the above question.

**Measure ID**

HHCAHPS_4, 30801041

**Measure Title**

Adults who reported a home health provider asking to see all the prescription and over-the-counter medicines they were taking, when they first started getting home health care

**Measure Source**

Centers for Medicare & Medicaid Services (CMS), Home Health Consumer Assessment of Healthcare Providers and Systems (HHCAHPS).

**Table Descriptions**

Geographic Representation: National, State

Years Available: 2012-2016

Population Subgroups: Age, ethnicity/race, education, language spoken at home

**Data Source**

CMS, HHCAHPS

**Denominator**

Adult home health patients age 18 and over who provided a valid response to the question, "When you first started getting home health care from this agency, did someone from the agency ask to see all the prescription and over-the-counter medicines you are taking?", excluding nonrespondents and respondents indicating "do not remember."

**Numerator**

Subset of the Denominator who responded "yes" to the above question.

**Measure ID**

HHCAHPS_7, 30801071

**Measure Title**

Adults who reported that home health providers talked with them about the purpose for taking their new or changed prescription medicines in the last 2 months of care

**Measure Source**

Centers for Medicare & Medicaid Services (CMS), Home Health Consumer Assessment of Healthcare Providers and Systems (HHCAHPS).

**Table Descriptions**

Geographic Representation: National, State

Years Available: 2012-2016

Population Subgroups: Age, ethnicity/race, education, language spoken at home

**Data Source**

CMS, HHCAHPS

**Denominator**

Adult home health patients age 18 and over who provided a valid response to the question, “In the last 2 months of care, did home health providers from this agency talk with you about the purpose for taking your new or changed prescription medicines?”, excluding nonrespondents and respondents indicating “did not take any new prescription medicines or change and medicines.”

**Numerator**

Subset of the Denominator who responded “yes” to the above question.

**Measure ID**

HHCAHPS_8, 30801081

**Measure Title**

Adults who reported that home health providers talked with them about when to take medicines in the last 2 months of care

**Measure Source**

Centers for Medicare & Medicaid Services (CMS), Home Health Consumer Assessment of Healthcare Providers and Systems (HHCAHPS).

**Table Descriptions**

Geographic Representation: National, State

Years Available: 2012-2016

Population Subgroups: Age, ethnicity/race, education, language spoken at home

**Data Source**

CMS, HHCAHPS

**Denominator**

Adult home health patients age 18 and over who provided a valid response to the question, “In the last 2 months of care, did home health providers from this agency talk with you about when to take these medicines?”, excluding nonrespondents and respondents indicating “did not take any new prescription medicines or change and medicines.”

**Numerator**

Subset of the Denominator who responded “yes” to the above question.

**Measure ID**

HHCAHPS_9, 30801091

**Measure Title**

Adults home health patients age 18 and over who reported that home health providers talked with them about the side effects of medicines in the last 2 months of care

**Measure Source**

Centers for Medicare & Medicaid Services (CMS), Home Health Consumer Assessment of Healthcare Providers and Systems (HHCAHPS).

**Table Descriptions**

Geographic Representation: National, State

Years Available: 2012- 2016

Population Subgroups: Age, ethnicity/race, education, language spoken at home

**Data Source**

CMS, HHCAHPS

**Denominator**

Adult home health patients age 18 and over who provided a valid response to the question, “In the last 2 months of care, did home health providers from this agency talk with you about the side effects of these medicines?”, excluding nonrespondents and respondents indicating “did not take any new prescription medicines or change and medicines.”

**Numerator**

Subset of the Denominator who responded “yes” to the above question.