NATIONAL HEALTHCARE QUALITY AND DISPARITIES REPORT

Chartbook on Patient Safety

Agency for Healthcare Research and Quality

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NATIONAL HEALTHCARE QUALITY AND DISPARITIES REPORT
CHARTBOOK ON PATIENT SAFETY

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Agency for Healthcare Research and Quality
5600 Fishers Lane
Rockville, MD 20857
www.ahrq.gov

AHRQ Publication No. 23-0032
Updates 21-0012
March 2023
www.ahrq.gov/research/findings/nhqrdr/index.html

ACKNOWLEDGMENTS

The National Healthcare Quality and Disparities Report (NHQDR) is the product of collaboration among agencies across the U.S. Department of Health and Human Services (HHS). Many individuals guided and contributed to this effort. Without their magnanimous support, this chartbook would not have been possible. Specifically, we thank:

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INTRODUCTION

This Patient Safety Chartbook is part of a family of documents and tools that support the *National Healthcare Quality and Disparities Report* (NHQDR). The NHQDR is an annual report to Congress mandated in the Healthcare Research and Quality Act of 1999 (P.L. 106-129). The NHQDR provides a comprehensive overview of the quality of healthcare received by the general U.S. population and disparities in care experienced by different racial and socioeconomic groups.

The purpose of the reports is to assess the performance of our healthcare system and to identify areas of strengths and weaknesses in the healthcare system along three main axes: the portrait of American healthcare, special emphasis topics, and quality and disparities tables.

The reports are based on more than 440 measures of quality and disparities covering a broad array of healthcare services and settings. Data generally cover 2000 through 2022. The reports are produced with the help of a Federal Interagency Work Group led by the Agency for Healthcare Research and Quality (AHRQ) and submitted to Congress on behalf of the Secretary of the U.S. Department of Health and Human Services (HHS). To access the most recent NHQDR, including methodologies and measure lists, go to https://www.ahrq.gov/research/findings/nhqrdr/nhqdr22/index.html.

CHARTBOOK ORGANIZATION AND BACKGROUND

The chartbooks are organized around six priority areas:

1. Making care safer by reducing harm caused in the delivery of care.
2. Ensuring that each person and family is engaged as partners in their care.
3. Promoting effective communication and coordination of care.
4. Promoting the most effective prevention and treatment practices for the leading causes of mortality, such as cardiovascular disease.
5. Working with communities to promote wide use of best practices to enable healthy living.
6. Making quality care more affordable for individuals, families, employers, and governments by developing and spreading new healthcare delivery models.

Patient Safety is one of the six national priorities identified by the NHQDR. These priority areas are interrelated and work to support all priority areas and can support necessary and critical improvements in making care safer. Readers can access the latest NHQDR chartbooks at https://www.ahrq.gov/research/findings/nhqrdr/chartbooks/index.html.

Priority 1: Making Care Safer by Reducing Harm Caused in the Delivery of Care

AHRQ has identified three long-term goals related to patient safety: reduce preventable hospital admissions and readmissions, reduce the incidence of adverse healthcare-associated conditions, and reduce harm from inappropriate or unnecessary care. This chartbook focuses on adverse healthcare-associated conditions and harm from inappropriate or unnecessary care.

Preventable admissions and readmissions can result from problems with patient safety or problems with care coordination. We have chosen to include most measures of preventable admissions and readmissions in the Care Coordination chartbook. To access the most recent Care Coordination chartbook, go to https://www.ahrq.gov/research/findings/nhqrdr/chartbooks/carecoordination/index.html.

Patient Safety Origins in the United States

Patient safety is the freedom from accidental or preventable injuries produced by medical care (Kohn, et al., 2000). Patient safety research examines systems-based gaps to improve safety and patient outcomes.

Medical error and other patient safety issues can be deadly:

- One estimate of the number of hospital-acquired conditions in U.S. hospitals in 2017 was approximately 2,550,000 cases (AHRQ, 2019a).
- One estimate of the age-standardized mortality rate due to adverse effects of medical treatment was 1.15 per 100,000 population in 2016 (Sunshine, et al., 2019).

AHRQ is one of the lead federal agencies for patient safety research. AHRQ partners with many federal agencies to support patient safety and quality improvement work. These agencies include the Centers for Medicare & Medicaid Services, Centers for Disease Control and Prevention, Food and Drug Administration, Health Resources and Services Administration, and other agencies within and outside HHS.

Key Definitions

The patient safety field uses terms including ***adverse event*** and ***patient safety event*** to describe incidents in which patient harm may occur as a result of healthcare (rather than from an underlying disease). Among other terms used by organizations such as The Joint Commission are ***sentinel events***. These patient safety events result in death, permanent harm, or serious temporary harm to a patient.

Some events pose hazards to patients but do not result in harm. These patient safety events are called ***near-misses***. Patients experience a near-miss when they are exposed to a hazardous situation but do not experience harm (either through luck or early detection).

These definitions are detailed on AHRQ's PSNet website (https://psnet.ahrq.gov/primer/patient-safety-101). More information on sentinel events is available at The Joint Commission website, https://www.jointcommission.org/resources/patient-safety-topics/sentinel-event/.

Patient Safety Research Landscape

Since 1999, the patient safety field has made advances such as the reduction of select healthcare-associated infections and medication-related events. These advances have been made through novel strategies, such as clinical decision support, surveillance, treatment protocols, and education and training through simulation. Advancements in safety research and implementation are further described on AHRQ's PSNet.

In April 2020, AHRQ published Making Healthcare Safer III, the third compendium of existing and emerging patient safety best practices. In September 2020, AHRQ and the Institute for Healthcare Improvement copublished the National Action Plan to Advance Patient Safety. AHRQ and several organizations committed to patient safety developed this plan. It focuses on culture, leadership, and governance; patient and family engagement; workforce safety; and learning systems—all foundational needs for safe care.

The body of research examining disparities in patient safety continues to evolve in the United States and abroad (Metersky, et al., 2011; Piccardi, et al., 2018; Noursi, et al., 2020; Fasano, et al., 2020; Thomas, et al., 2020).

CHARTBOOK CONTENT

This chartbook includes:

- Summaries of trends across measures of patient safety from the NHQDR.
- Figures illustrating select measures of patient safety.
- Supplemental descriptions and data on patient safety measures from several outside sources.

References:

- Introduction and Methods contains information about methods used in the chartbook.
- A Data Query tool provides access to most NHQDR data tables (https://datatools.ahrq.gov/nhqdr).

Data Sources:

- Agency for Healthcare Research and Quality (AHRQ):
  - Healthcare Cost and Utilization Project (HCUP)
  - Medical Expenditure Panel Survey (MEPS)
  - Quality and Safety Review System (QSRS)
- Centers for Disease Control and Prevention (CDC):
  - National Vital Statistics System – Natality (NVSS-N)
- Centers for Medicare & Medicaid Services (CMS):
  - Home Health Care Consumer Assessment of Healthcare Providers and Systems (HHCAHPS)
  - Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)
  - Hospital Inpatient Quality Reporting (HIQR) (formerly the Quality Improvement Organization)
  - Outcome and Assessment Information Set (OASIS)
  - Minimum Data Set (MDS)

Previous patient safety chartbooks reported data from the Medicare Patient Safety Monitoring System (MPSMS). As of October 2020, however, MPSMS has been replaced by QSRS. Due to the COVID-19 pandemic, QSRS data were not collected from January to August 2020. QSRS is an improved patient safety surveillance system that is expected to have an expanded list of adverse event measures.

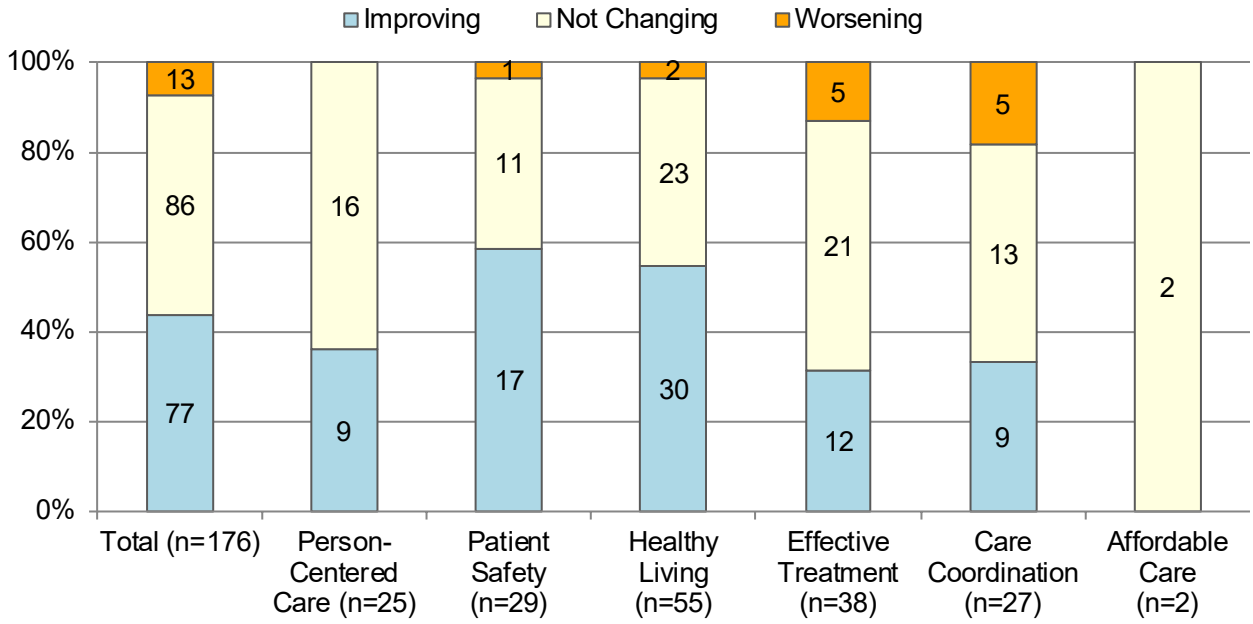
QSRS data are collected through retrospective manual abstraction of inpatient records. QSRS uses standardized definitions and algorithms consistent with the AHRQ Common Formats for Surveillance. Therefore, analysis of some events originally included in previous chartbooks has been removed entirely or changed for one of the following reasons:

- The data are not available from QSRS.
- The data do not meet the criteria for statistical reliability, data quality, or confidentiality.

More information on the departure from MPSMS is available at AHRQ's QSRS web page.

TRENDS ACROSS NHQDR PRIORITIES

Number and percentage of quality measures improving, not changing, or worsening from 2000 to 2020, total and by priority area



Key: n = number of measures.
Note: This graph is limited to those measures that have the minimum four data points that AHRQ requires to conduct a trend analysis. For each measure with at least four estimates over time, unweighted log-linear regression is used to calculate average annual percentage change (AAPC) and to assess the statistical significance of the rate of change ($p < 0.10$). Rates are aligned so that negative change indicates improved care. The model used is $\ln(M) = \beta_0 + \beta_1 Y$, where $\ln(M)$ is the natural logarithm of the aligned rate, β_0 is the intercept or constant, and β_1 is the coefficient corresponding to year Y (e.g., the average annual percentage change = $100 \cdot (\exp(\beta)-1)$).

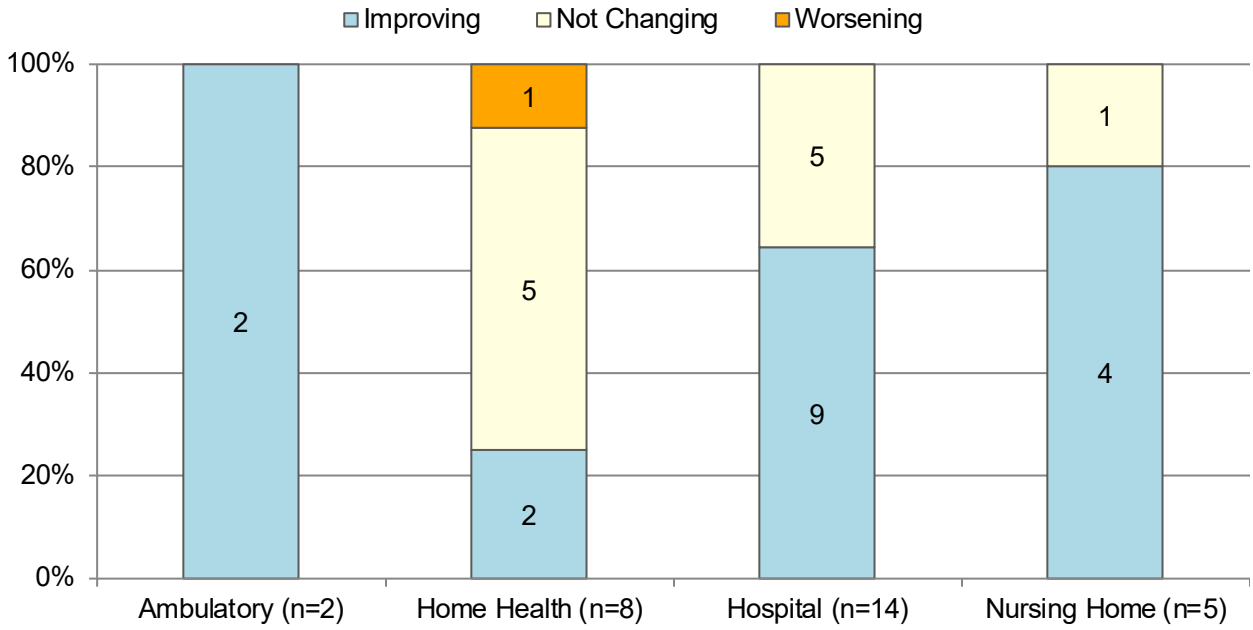
- **Improving** = Average annual percentage change >1% per year in a favorable direction and $p < 0.10$.
- **Not Changing** = Average annual percentage change ≤1% per year or $p \geq 0.10$.
- **Worsening** = Average annual percentage change >1% per year in an unfavorable direction and $p < 0.10$.

- Through 2020, across a broad spectrum of healthcare quality measures, less than half (44%) showed improvement.
- Person-Centered Care: 36% of person-centered care measures were improving overall.
- Patient Safety: More than half of patient safety measures were improving overall.
    - The one measure with worsening results was "Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care."
- Healthy Living: More than 50% of healthy living measures were improving overall.
- Effective Treatment: More than 30% of effective treatment measures were improving overall.
- Care Coordination: More than 30% of care coordination measures were improving overall.
- Affordable Care: No affordable care measures showed improvement overall.
- Access measures are not represented on this graph. For more information, refer to the 2022 National Healthcare Quality and Disparities Report.

Trends in Patient Safety

Trends by Setting of Care

Number and percentage of patient safety measures improving, not changing, or worsening from 2002 to 2020, by setting of care



Key: n = number of measures.

- **Importance:** The chartbook is organized around setting of care; stratifying trends by care setting provides insight into which settings are exhibiting more or fewer measures improving.
- **Findings:**
    - Both ambulatory care measures, 25% of home health measures, 64% of hospital measures, and 80% of nursing home measures were improving overall.

- The home health measure that is worsening is "Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care," which declined from 78.8% in 2012 to 74.5% in 2020.

Ambulatory Measures:

- Improving:

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

Home Health Measures:

- Improving:

1. Home health care patients whose surgical wound improved
2. Home health care patients whose management of oral medications improved

- Not Changing:

1. Adults who reported a home health care 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
2. Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care
3. Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care
4. Adults who reported that home health care providers talked with them about when to take medicines in the last 2 months of care
5. Adults who reported that home health care providers talked with them about the side effects of medicines in the last 2 months of care

- Worsening**:**

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

Hospital Measures:

- Improving:

    1. Postoperative sepsis per 1,000 elective-surgery admissions, age 18 and over
    2. Hospital 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
    3. Postoperative pulmonary embolism or deep vein thrombosis per 1,000 surgical admissions, age 18 and over
    4. Postoperative respiratory failure, prolonged mechanical ventilation, or reintubation per 1,000 elective-surgery admissions, age 18 and over
    5. Postoperative acute kidney injury requiring dialysis per 1,000 elective-surgery admissions, age 18 and over
    6. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age less than 18 years
    7. Hospital admissions with iatrogenic pneumothorax per 1,000 medical and surgical admissions, age 18 and over
    8. Deaths per 1,000 elective-surgery admissions who developed serious treatable complications of care during hospitalization, ages 18-89 or obstetric admissions
    9. Deaths per 1,000 hospital admissions with expected low mortality, age 18 and over or obstetric admissions

- **Not Changing:**

    1. Perioperative hemorrhage or hematoma with surgical drainage or evacuation per 1,000 surgical admissions, age 18 and over
    2. Postoperative hip fracture per 1,000 surgical admissions who were not susceptible to falling, age 18 and over
    3. Reclosure of postoperative abdominal wound dehiscence per 1,000 abdominopelvic-surgery admissions of length 2 or more days, age 18 and over
    4. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age 18 and over
    5. Birth trauma - injury to neonate per 1,000 live births

Nursing Home Measures:

- Improving:

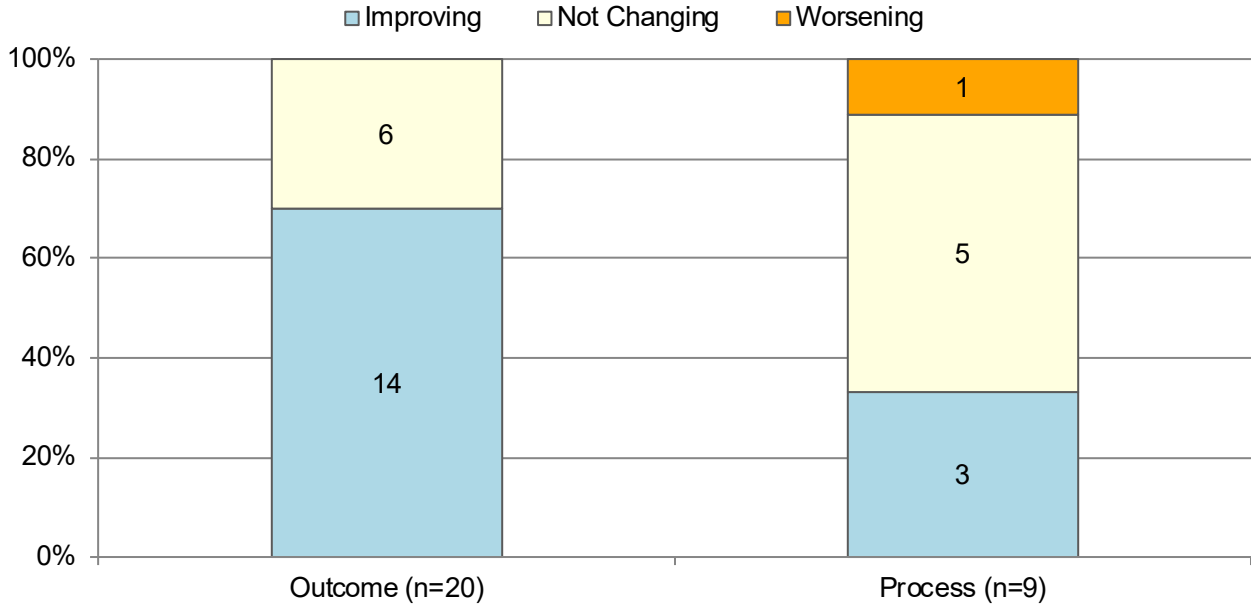
    1. High-risk, long-stay nursing home residents with pressure ulcer
    2. Long-stay nursing home residents with a urinary tract infection
    3. Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder
    4. Short-stay nursing home patients with pressure ulcers that are new or worsened

- Not Changing:

    1. Long-stay nursing home residents experiencing one or more falls with major injury

Trends by Type of Measure

Number and percentage of patient safety measures improving, not changing, or worsening from 2002 to 2020, by type of measure



Key: n = number of measures.

- **Importance:** The ultimate goal of quality improvement is to produce better patient outcomes. Improvements in processes may or may not lead to improved patient outcomes.
- **Findings:**
  - Most (70%) outcome measures improved, while 33% of process measures improved. Type of measure and setting of care are related; 14 of 20 outcome measures are hospital measures, while no process measures are hospital measures.
  - The process measure that is worsening is "Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care," which declined from 78.8% in 2012 to 74.5% in 2020.

Outcome Measures:

- Improving:

1. Postoperative sepsis per 1,000 elective-surgery admissions, age 18 and over
2. Hospital 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
3. Postoperative pulmonary embolism or deep vein thrombosis per 1,000 surgical admissions, age 18 and over
4. Postoperative respiratory failure, prolonged mechanical ventilation, or reintubation per 1,000 elective-surgery admissions, age 18 and over

5. Postoperative acute kidney injury requiring dialysis per 1,000 elective-surgery admissions, age 18 and over
6. Home health care patients whose surgical wound improved
7. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age less than 18 years
8. Hospital admissions with iatrogenic pneumothorax per 1,000 medical and surgical admissions, age 18 and over
9. Deaths per 1,000 elective-surgery admissions who developed serious treatable complications of care during hospitalization, ages 18-89 or obstetric admissions
10. Deaths per 1,000 hospital admissions with expected low mortality, age 18 and over or obstetric admissions
11. Home health care patients whose management of oral medications improved
12. High-risk, long-stay nursing home residents with pressure ulcer
13. Long-stay nursing home residents with a urinary tract infection
14. Short-stay nursing home patients with pressure ulcers that are new or worsened

- Not Changing:

1. Perioperative hemorrhage or hematoma with surgical drainage or evacuation per 1,000 surgical admissions, age 18 and over
2. Postoperative hip fracture per 1,000 surgical admissions who were not susceptible to falling, age 18 and over
3. Reclosure of postoperative abdominal wound dehiscence per 1,000 abdominopelvic-surgery admissions of length 2 or more days, age 18 and over
4. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age 18 and over
5. Birth trauma - injury to neonate per 1,000 live births
6. Long-stay nursing home residents experiencing one or more falls with major injury

Process Measures:

- Improving:

1. 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
2. Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults
3. Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder

- Not Changing:

1. Adults who reported a home health care 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
2. Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care

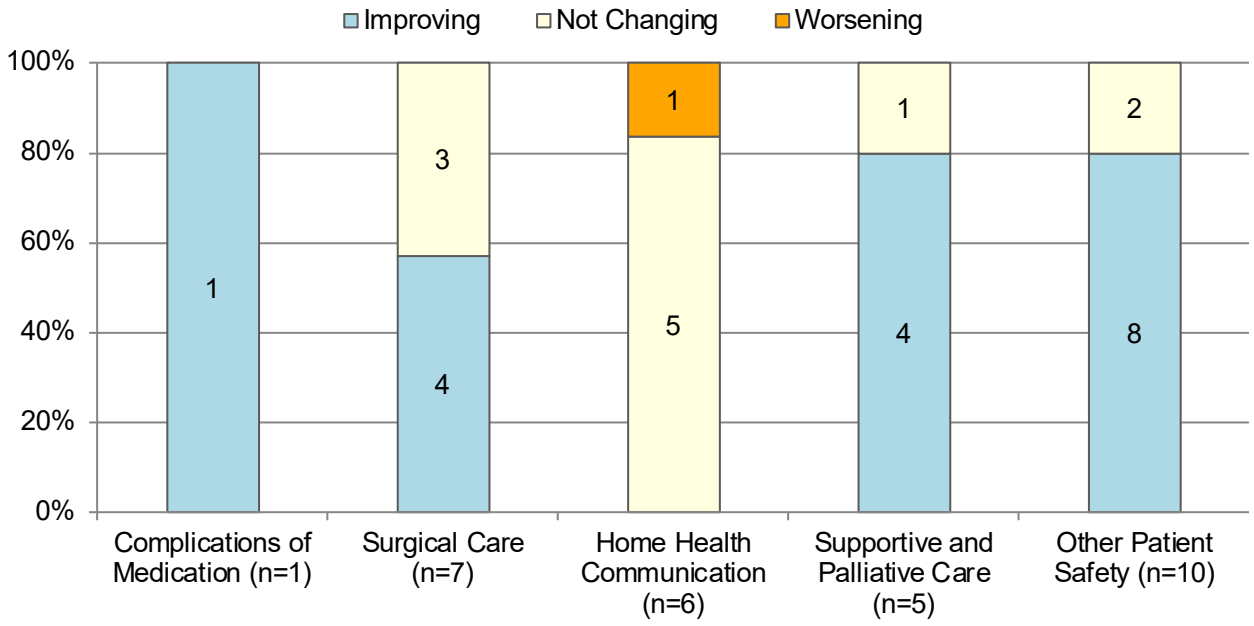
3. Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care
4. Adults who reported that home health care providers talked with them about when to take medicines in the last 2 months of care
5. Adults who reported that home health care providers talked with them about the side effects of medicines in the last 2 months of care

- Worsening:

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

Trends by Sub-Area

Number and percentage of patient safety measures improving, not changing, or worsening from 2002 to 2020, by sub-area



Key: n = number of measures.
Note: Among the list of surgical care measures, the chartbook lists a home health care measure in the surgical care area due to its scope. All other surgical care measures are specific to the inpatient setting.

- **Importance:** Improvement is not concentrated in one aspect of care but is spread over multiple aspects of care.
- **Findings:**

  - Four of five (80%) Supportive and Palliative Care measures were improving, as were 8 of 10 (80%) Other Patient Safety measures and the one Complications of Medication measure. Four of 7 (57%) Surgical Care measures and no Home Health Communication measures were improving.

- Home Health Communication is the only area in which any measure was worsening:
  - "Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care," which declined from 78.8% in 2012 to 74.5% in 2020.

Complications of Medication:

- Improving:

1. Home health care patients whose management of oral medications improved

Surgical Care:

- Improving:

1. Postoperative pulmonary embolism or deep vein thrombosis per 1,000 surgical admissions, age 18 and over
2. Postoperative respiratory failure, prolonged mechanical ventilation, or reintubation per 1,000 elective-surgery admissions, age 18 and over
3. Postoperative acute kidney injury requiring dialysis per 1,000 elective-surgery admissions, age 18 and over
4. Home health care patients whose surgical wound improved

- Not Changing:

1. Perioperative hemorrhage or hematoma with surgical drainage or evacuation per 1,000 surgical admissions, age 18 and over
2. Postoperative hip fracture per 1,000 surgical admissions who were not susceptible to falling, age 18 and over
3. Reclosure of postoperative abdominal wound dehiscence per 1,000 abdominopelvic-surgery admissions of length 2 or more days, age 18 and over

Home Health Communication:

- Not Changing:

1. Adults who reported a home health care 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
2. Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care
3. Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care
4. Adults who reported that home health care providers talked with them about when to take medicines in the last 2 months of care
5. Adults who reported that home health care providers talked with them about the side effects of medicines in the last 2 months of care

- Worsening:

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

Supportive and Palliative Care:

- Improving:

    1. High-risk, long-stay nursing home residents with pressure ulcer
    2. Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder
    3. Long-stay nursing home residents with a urinary tract infection
    4. Short-stay nursing home patients with pressure ulcers that are new or worsened

- Not Changing:

    1. Long-stay nursing home residents experiencing one or more falls with major injury

Other Patient Safety (detailed sub-area in parentheses):

- Improving:

    1. Postoperative sepsis per 1,000 elective-surgery admissions, age 18 and over (Healthcare-Associated Infections)
    2. Hospital 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 (Healthcare-Associated Infections)
    3. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age less than 18 years (Other Complications of Hospital Care)
    4. Hospital admissions with iatrogenic pneumothorax per 1,000 medical and surgical admissions, age 18 and over (Other Complications of Hospital Care)
    5. Deaths per 1,000 elective-surgery admissions who developed serious treatable complications of care during hospitalization, ages 18-89 or obstetric admissions (Other Complications of Hospital Care)
    6. Deaths per 1,000 hospital admissions with expected low mortality, age 18 and over or obstetric admissions (Other Complications of Hospital Care)
    7. 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 (Inappropriate Treatment)
    8. Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults (Inappropriate Treatment)

- Not Changing:

    1. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age 18 and over (Other Complications of Hospital Care)
    2. Birth trauma - injury to neonate per 1,000 live births

Summary of Patient Safety Trends

Improving

- Measure years are from 2002, 2013, or 2014 through 2019 or 2020.
- Improving measures are defined as average percentage changes greater than 1% per year in a favorable direction and statistically significant.
- The measure of improvement is the average annual percentage change (AAPC). Rates are aligned to the negative direction, so AAPC less than –1% indicates improvement.

Of 29 measures, 17 were improving. The three measures with the largest rate of improvement are:

- Postoperative respiratory failure, prolonged mechanical ventilation, or reintubation per 1,000 elective-surgery admissions, age 18 and over (HCUP).
- Long-stay nursing home residents with a urinary tract infection (MDS).
- Short-stay nursing home patients with pressure ulcers that are new or worsened (MDS).

The remaining 14 measures from largest to smallest rate of improvement are:

- Hospital admissions with iatrogenic pneumothorax per 1,000 medical and surgical admissions, age 18 and over
- Home health care patients whose management of oral medications improved
- Hospital 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
- Deaths per 1,000 hospital admissions with expected low mortality, age 18 and over or obstetric admissions
- Postoperative sepsis per 1,000 elective-surgery admissions, age 18 and over
- Postoperative acute kidney injury requiring dialysis per 1,000 elective-surgery admissions, age 18 and over
- 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
- Home health care patients whose surgical wound improved
- Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder
- Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults
- Postoperative pulmonary embolism or deep vein thrombosis per 1,000 surgical admissions, age 18 and over
- Deaths per 1,000 elective-surgery admissions who developed serious treatable complications of care during hospitalization, ages 18-89 or obstetric admissions
- Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age less than 18 years
- High-risk, long-stay nursing home residents with pressure ulcer

Not Changing

- Measure years are from 2002, 2013, or 2014 through 2019 or 2020.
- Measures not changing are defined as rates of change that are no greater than 1% per year (positive or negative) or are not statistically significant.

Of 29 measures, 11 were not changing. Of the measures not changing over time, five were HHCAHPS measures regarding home health communication about medication:

- Adults who reported a home health care 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
- Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care
- Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care
- Adults who reported that home health care providers talked with them about when to take medicines in the last 2 months of care
- Adults who reported that home health care providers talked with them about the side effects of medicines in the last 2 months of care

One MDS measure examined nursing home care:

- Long-stay nursing home residents experiencing one or more falls with major injury

The remaining five measures that were not changing were HCUP measures covering surgical care and maternal health:

- Perioperative hemorrhage or hematoma with surgical drainage or evacuation per 1,000 surgical admissions, age 18 and over
- Postoperative hip fracture per 1,000 surgical admissions who were not susceptible to falling, age 18 and over
- Reclosure of postoperative abdominal wound dehiscence per 1,000 abdominopelvic-surgery admissions of length 2 or more days, age 18 and over
- Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age 18 and over
- Birth trauma - injury to neonate per 1,000 live births

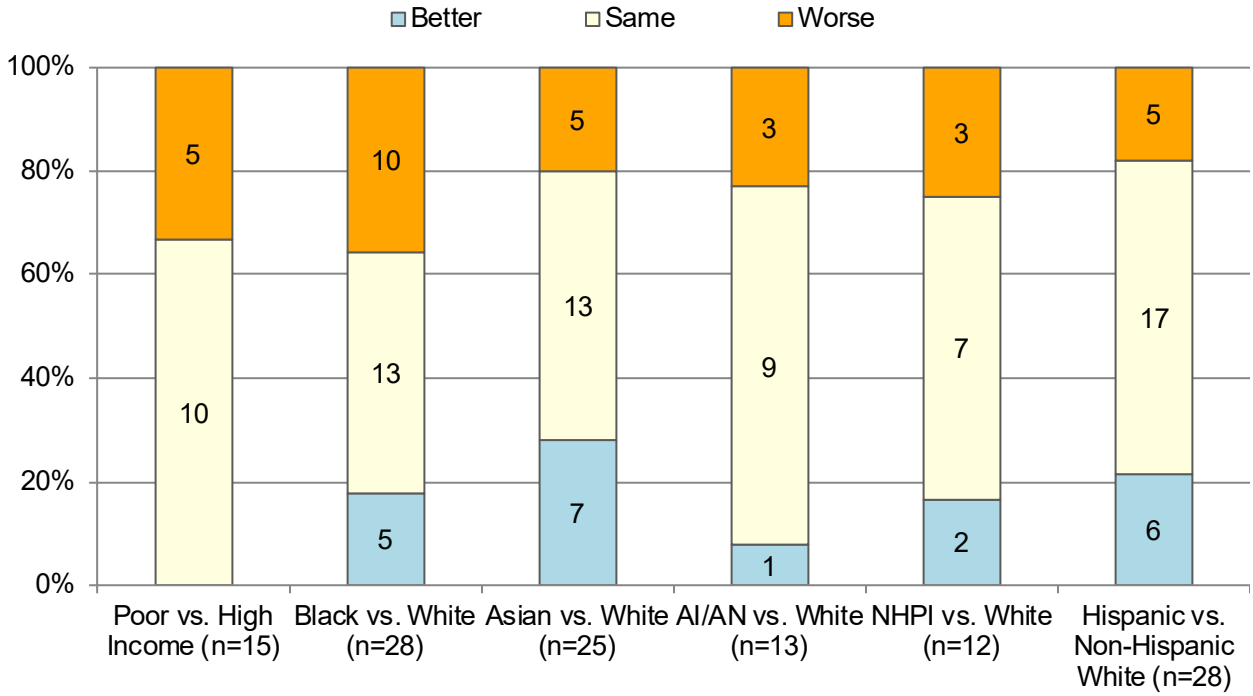
Worsening

- Worsening measures are defined as having an AAPC of more than 1% per year in an unfavorable direction and statistically significant.
- Of 29 measures, only one was worsening overall: The percentage of adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care.

DISPARITIES IN PATIENT SAFETY

Overall Disparities

Number and percentage of patient safety measures for which members of select groups experienced better, same, or worse quality of care compared with reference group, 2019-2020



Key: AI/AN = American Indian or Alaska Native; NHPI = Native Hawaiian/Pacific Islander; n = number of measures.
Note: Poor indicates family income less than the federal poverty guideline. High Income indicates family income four times the federal poverty guideline or greater. White, Black, Asian, AI/AN, and NHPI are non-Hispanic. Hispanic includes all races.
Numbers of measures differ across groups because of data limitations. The data shown here are from 2019 or later. This figure reflects the most current data year available and is not limited to measures that met the criteria for conducting a trend analysis (i.e., may include fewer than four data points). The absolute and relative differences between a selected group and its reference group are used to assess disparities.

- **Better** = Selected group received better quality of care than reference group. The absolute difference is statistically significant ($p < 0.05$) and the relative difference is equal to or larger than 10% and favors the selected group.
- **Same** = Selected group and reference group received about the same quality of care. The absolute difference is not statistically significant, or the relative difference is smaller than 10%.
- **Worse** = Selected group received worse quality of care than reference group. The absolute difference is statistically significant, and the relative difference is equal to or larger than 10% and favors the reference group.

- People in poor households received worse care than people in high-income households for one-third (33%) of patient safety measures.
- Black patients received worse care than White patients for more than one-third (36%) of patient safety measures.

- Asian patients received worse care than White patients for one-fifth (20%) of patient safety measures.
- American Indian and Alaska Native (AI/AN) patients received worse care than White patients for 23% of patient safety measures.
- Native Hawaiian/Pacific Islander **(**NHPI) patients received worse care than White patients for a quarter (25%) of patient safety measures.
- Hispanic patients received worse care than White patients for 18% of patient safety measures.

Measure List:

Poor vs. High Income Disparities:

- Same Performance:

    1. Hospital 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
    2. Perioperative hemorrhage or hematoma with surgical drainage or evacuation per 1,000 surgical admissions, age 18 and over
    3. Postoperative pulmonary embolism or deep vein thrombosis per 1,000 surgical admissions, age 18 and over
    4. Postoperative hip fracture per 1,000 surgical admissions who were not susceptible to falling, age 18 and over
    5. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age 18 and over
    6. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age less than 18 years
    7. Hospital admissions with iatrogenic pneumothorax per 1,000 medical and surgical admissions, age 18 and over
    8. Deaths per 1,000 elective-surgery admissions who developed serious treatable complications of care during hospitalization, ages 18-89 or obstetric admissions
    9. Birth trauma - injury to neonate per 1,000 live births
    10. Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults

- Worse Performance:

    1. Postoperative sepsis per 1,000 elective-surgery admissions, age 18 and over
    2. Postoperative respiratory failure, prolonged mechanical ventilation, or reintubation per 1,000 elective-surgery admissions, age 18 and over
    3. Postoperative acute kidney injury requiring dialysis per 1,000 elective-surgery admissions, age 18 and over
    4. Reclosure of postoperative abdominal wound dehiscence per 1,000 abdominopelvic-surgery admissions of length 2 or more days, age 18 and over
    5. Deaths per 1,000 hospital admissions with expected low mortality, age 18 and over or obstetric admissions

Black vs. White Disparities:

- Better Performance:

  1. Birth trauma - injury to neonate per 1,000 live births
  2. Long-stay nursing home residents with a urinary tract infection
  3. Long-stay nursing home residents experiencing one or more falls with major injury
  4. Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care
  5. Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care

- Same Performance:

  1. Hospital 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
  2. Postoperative hip fracture per 1,000 surgical admissions who were not susceptible to falling, age 18 and over
  3. Reclosure of postoperative abdominal wound dehiscence per 1,000 abdominopelvic-surgery admissions of length 2 or more days, age 18 and over
  4. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age less than 18 years
  5. Hospital admissions with iatrogenic pneumothorax per 1,000 medical and surgical admissions, age 18 and over
  6. Deaths per 1,000 elective-surgery admissions who developed serious treatable complications of care during hospitalization, ages 18-89 or obstetric admissions
  7. Deaths per 1,000 hospital admissions with expected low mortality, age 18 and over or obstetric admissions
  8. Home health care patients whose management of oral medications improved
  9. Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults
  10. Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder
  11. Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care
  12. Adults who reported that home health care providers talked with them about when to take medicines in the last 2 months of care
  13. Adults who reported that home health care providers talked with them about the side effects of medicines in the last 2 months of care

- Worse Performance:

  1. Postoperative sepsis per 1,000 elective-surgery admissions, age 18 and over
  2. Perioperative hemorrhage or hematoma with surgical drainage or evacuation per 1,000 surgical admissions, age 18 and over

3. Postoperative pulmonary embolism or deep vein thrombosis per 1,000 surgical admissions, age 18 and over
4. Postoperative respiratory failure, prolonged mechanical ventilation, or reintubation per 1,000 elective-surgery admissions, age 18 and over
5. Postoperative acute kidney injury requiring dialysis per 1,000 elective-surgery admissions, age 18 and over
6. Home health care patients whose surgical wound improved
7. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age 18 and over
8. High-risk, long-stay nursing home residents with pressure ulcer
9. Short-stay nursing home patients with pressure ulcers that are new or worsened
10. Adults who reported a home health care 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

Asian vs. White Disparities:

- Better Performance:

1. Postoperative pulmonary embolism or deep vein thrombosis per 1,000 surgical admissions, age 18 and over
2. High-risk, long-stay nursing home residents with pressure ulcer
3. Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder
4. Long-stay nursing home residents with a urinary tract infection
5. Long-stay nursing home residents experiencing one or more falls with major injury
6. Short-stay nursing home patients with pressure ulcers that are new or worsened
7. Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care

- Same Performance:

1. Hospital 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
2. Postoperative respiratory failure, prolonged mechanical ventilation, or reintubation per 1,000 elective-surgery admissions, age 18 and over
3. Postoperative acute kidney injury requiring dialysis per 1,000 elective-surgery admissions, age 18 and over
4. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age less than 18 years
5. Hospital admissions with iatrogenic pneumothorax per 1,000 medical and surgical admissions, age 18 and over
6. Deaths per 1,000 elective-surgery admissions who developed serious treatable complications of care during hospitalization, ages 18-89 or obstetric admissions
7. Deaths per 1,000 hospital admissions with expected low mortality, age 18 and over or obstetric admissions
8. Birth trauma - injury to neonate per 1,000 live births

9. Adults who reported a home health care 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
10. Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care
11. Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care
12. Adults who reported that home health care providers talked with them about when to take medicines in the last 2 months of care
13. Adults who reported that home health care providers talked with them about the side effects of medicines in the last 2 months of care

- Worse Performance:

1. Postoperative sepsis per 1,000 elective-surgery admissions, age 18 and over
2. Perioperative hemorrhage or hematoma with surgical drainage or evacuation per 1,000 surgical admissions, age 18 and over
3. Home health care patients whose surgical wound improved
4. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age 18 and over
5. Home health care patients whose management of oral medications improved

AI/AN vs. White Disparities:

- Better Performance:

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

- Same Performance:

1. Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder
2. Long-stay nursing home residents with a urinary tract infection
3. Long-stay nursing home residents experiencing one or more falls with major injury
4. Short-stay nursing home patients with pressure ulcers that are new or worsened
5. Adults who reported a home health care 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
6. Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care
7. Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care
8. Adults who reported that home health care providers talked with them about when to take medicines in the last 2 months of care
9. Adults who reported that home health care providers talked with them about the side effects of medicines in the last 2 months of care

- Worse Performance:

    1. Home health care patients whose surgical wound improved
    2. Home health care patients whose management of oral medications improved
    3. High-risk, long-stay nursing home residents with pressure ulcer

NHPI vs. White Disparities:

- Better Performance:

    1. Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care
    2. Long-stay nursing home residents with a urinary tract infection

- Same Performance:

    1. Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder
    2. Short-stay nursing home patients with pressure ulcers that are new or worsened
    3. Adults who reported a home health care 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
    4. Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care
    5. Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care
    6. Adults who reported that home health care providers talked with them about when to take medicines in the last 2 months of care
    7. Adults who reported that home health care providers talked with them about the side effects of medicines in the last 2 months of care

- Worse Performance:

    1. Home health care patients whose surgical wound improved
    2. Home health care patients whose management of oral medications improved
    3. High-risk, long-stay nursing home residents with pressure ulcer

Hispanic vs. White Disparities:

- Better Performance:

    1. Birth trauma - injury to neonate per 1,000 live births
    2. Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults
    3. Long-stay nursing home residents with a urinary tract infection
    4. Long-stay nursing home residents experiencing one or more falls with major injury
    5. Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care

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

- Same Performance:

1. Hospital 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
2. Perioperative hemorrhage or hematoma with surgical drainage or evacuation per 1,000 surgical admissions, age 18 and over
3. Postoperative pulmonary embolism or deep vein thrombosis per 1,000 surgical admissions, age 18 and over
4. Postoperative acute kidney injury requiring dialysis per 1,000 elective-surgery admissions, age 18 and over
5. Postoperative hip fracture per 1,000 surgical admissions who were not susceptible to falling, age 18 and over
6. Reclosure of postoperative abdominal wound dehiscence per 1,000 abdominopelvic-surgery admissions of length 2 or more days, age 18 and over
7. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age 18 and over
8. Accidental puncture or laceration during a procedure per 1,000 medical and surgical admissions, age less than 18 years
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10. Deaths per 1,000 elective-surgery admissions who developed serious treatable complications of care during hospitalization, ages 18-89 or obstetric admissions
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15. Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care
16. Adults who reported that home health care providers talked with them about when to take medicines in the last 2 months of care
17. Adults who reported that home health care providers talked with them about the side effects of medicines in the last 2 months of care

- Worse Performance:

1. Postoperative sepsis per 1,000 elective-surgery admissions, age 18 and over
2. Postoperative respiratory failure, prolonged mechanical ventilation, or reintubation per 1,000 elective-surgery admissions, age 18 and over
3. Home health care patients whose surgical wound improved
4. Home health care patients whose management of oral medications improved
5. High-risk, long-stay nursing home residents with pressure ulcer

Trends in Disparities

Trends in disparities over time are only examined when a disparity existed in the earliest year of data available. Trends are assessed using unweighted regression. The average annual change (AAC) is computed for the selected group and the reference group. The difference between the AAC for the selected group and the AAC for the reference group is calculated and its statistical significance is assessed ($p < 0.10$). Rates are aligned so that change in the positive direction indicates improvement:

- **Improving:** The baseline disparity is shrinking. The difference in AAC is greater than 1 and is statistically significant.
- **Not changing:** The baseline disparity is not changing. The difference in AAC is between −1 and 1 or is not statistically significant.
- **Worsening:** The baseline disparity is becoming larger. The difference in AAC is less than −1 and is statistically significant.

No patient safety measure had worsening disparities over time.

Thirty-eight subgroup comparisons across 25 measures did not show any change over time, including:

- **Race.** Black vs. White: Postoperative sepsis per 1,000 elective-surgery admissions, age 18 and over.
- **Age.** 85 years and over vs. 18-44 years: Postoperative acute kidney injury requiring dialysis per 1,000 elective-surgery admissions, age 18 and over.
- **Sex.** Female vs. male: Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults.

MEASURES OF PATIENT SAFETY

Individual measures are presented by the setting in which care was provided:

- Hospitals
- Ambulatory care
- Nursing homes
- Home health care
- Infrastructure: Ambulatory surgery centers and medical offices

Select patient safety measure results are presented overall and by age, sex, race, ethnicity, health status, or presence of various health conditions. Unless otherwise noted, the measures presented for each setting are included in the summary analysis shown earlier.

Patient Safety in the Hospital Setting

To date, patient safety research has more closely examined adverse events and quality improvement activities implemented in hospital settings.

In this section, measures address:

- Healthcare-associated infections (HAIs).
- Maternal morbidity and mortality measures.
- Adverse drug events.

Healthcare-Associated Infections

Infections acquired during a hospital stay are among the most common complications of hospital care (AHRQ, 2019c). On any given day, about 1 in 25 hospital patients has at least one HAI (Magill, et al., 2014). HAIs often increase patients' length of stay in the hospital, risk of death, and hospital costs. New infections in critically ill infants, children, and other patients generally reduce their chances for recovery. More information is available from the HAI and Antibiotic Use Prevalence Survey, https://www.cdc.gov/hai/eip/antibiotic-use.html.

A common measure of HAIs is the standardized infection ratio (SIR). SIRs compare the observed numbers of specific types of infections with the numbers of infections predicted:

- The predicted numbers are based on various healthcare facility and patient population characteristics.
- SIRs are calculated based on infections that healthcare facilities report to the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) during a year.

SIRs facilitate comparative evaluations of hospital risk-adjusted performance. They were determined as follows:

- For various infections, CDC established baseline predicted infection rates using data from 2006-2011. They later established new baselines using 2015 data. Therefore, almost all 2015 national SIRs for various HAI types are very close to 1.0, and trends involving SIRs from previous years cannot be examined.
- NHSN data had been predominantly from intensive care units, although general medical/surgical inpatient wards and other non-critical care locations are also increasingly represented. The numbers of units/facilities reporting to NHSN roughly quadrupled from 2009 to 2014.
- Statewide SIRs with 95% confidence intervals entirely above 1.0 indicate that, on average, a given state's hospitals had more HAIs of a specific type than hospitals of similar type and size had reported during the baseline period. Conversely, statewide SIRs with 95% confidence intervals entirely below 1.0 indicate that the state's hospitals generally had fewer HAIs of that type than hospitals of similar type and size had reported during the baseline period.
- Statewide SIRs with 95% confidence intervals that included 1.0 indicated that their hospitals had roughly the same number of infections (e.g., catheter-associated urinary tract infections) as hospitals of similar type and size had reported during the referent period.

Standardized Infection Ratios for Specific HAIs

This chartbook presents the following measures related to HAIs:

- Distributions of state-specific SIRs for central line-associated bloodstream infections (CLABSIs) and NHSN-defined catheter-associated urinary tract infections (CAUTIs):
  - Restricted to acute care hospitals
  - Stratified by unit type
- Distributions of state-specific SIRs for hospital-onset *Clostridioides difficile* (*C. difficile*) infections seen in acute care hospitals

SIRs were calculated for all 50 states, District of Columbia, and Puerto Rico. Statewide SIRS were classified as:

- Below 1.0 if the 95% confidence intervals bounding the SIR point estimates were entirely below 1.0.
- Around 1.0 if the 95% confidence intervals bounding the SIR point estimates included 1.0.
- Above 1.0 if the 95% confidence intervals bounding the SIR point estimates were entirely above 1.0.

The following measures are organized by:

- Infection type: CLABSI, CAUTI, or *C. difficile*.
- Where data were collected: critical care units vs. wards.
- Summary level: National SIR, statewide SIR.

A CLABSI is a laboratory-confirmed bloodstream infection (LCBI) where a central line (CL) or umbilical catheter (UC) was in place for >2 calendar days on the date of event, with day of device placement being Day 1 and the line also being in place on the date of event or the day before. If a CL or UC was in place for >2 calendar days and then removed, the date of event of the LCBI must be the day of discontinuation or the next day to be a CLABSI (CDC, 2021a).

CAUTIs in the hospital setting are caused by instrumentation of the urinary tract (CDC, 2023). Potential complications resulting from the development of CAUTI include cystitis, pyelonephritis, endocarditis, septic arthritis, and meningitis. NHSN defines CAUTIs based on symptomatic urinary tract infection, asymptomatic bacteremic UTI, or urinary system infection criteria and using specific criteria related to the timing of catheter use and CAUTI diagnosis. These criteria, which differ from those used by QSRS, can be found at https://www.cdc.gov/nhsn/pdfs/pscmanual/7psccauticurrent.pdf.

C. difficile is a bacterium that can cause potentially fatal diarrhea. *C. difficile* infections are often associated with the use of antibiotics prescribed for other reasons that alter the balance of intestinal bacteria. NHSN defines hospital-onset *C. difficile* infections as those detected on the 4th day or later after admission to an inpatient location.

Infections counted for SIRs are restricted to acute care hospitals (excluding critical access hospitals, long-term acute care hospitals, and inpatient rehabilitation facilities) and are stratified by unit type:

- Critical care units (excluding neonatal intensive care units)
- General hospital wards

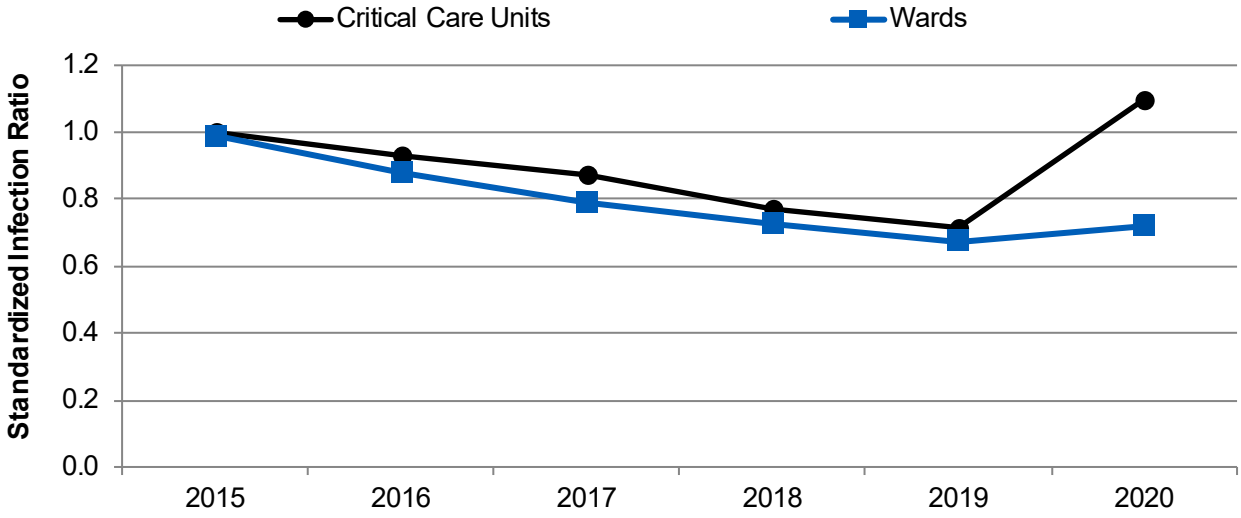
Data were submitted to NHSN by hospitals in all 50 states, District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands. SIRs were not calculated for states or territories with fewer than five facilities reporting data.

Guam and the Virgin Islands had too few hospitals for the calculation of state-level SIRs for any of the measures presented here. For the same reason, SIRs were not calculated for Vermont in 2017 or 2018 for "Central line-associated bloodstream infections seen in critical care units" and "Catheter-associated urinary tract infections seen in critical care units." Puerto Rico was not included in any year for "Hospital-onset *Clostridioides difficile* infections seen hospitalwide." In all years, however, data received from all states and all of the listed territories were included in the calculation of the U.S. national SIR.

NHSN calculated SIRs (and their 95% confidence intervals) for 52 individual state-equivalent jurisdictions (50 states plus District of Columbia and Puerto Rico). However, some state-level SIRs were based on small numbers (i.e., <50) of observed or predicted site-specific infections. Therefore, SIRs are displayed for the entire United States or are summarized by whether the state SIRs were above, around, or below 1.0 and are aggregated across the entire country or by the U.S. census region.

Infection Ratios for Central-Line Associated Bloodstream Infections

National SIR for central line-associated bloodstream infections seen in critical care units and wards (non-critical care units), 2015-2020



Source: Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, National and State Healthcare-Associated Infections Data Report, 2015-2020. http://www.cdc.gov/hai/data/portal/progress-report.html.

Note: SIRs below 1.0 are better. This measure is not included in the summary analysis.

- **Importance:** Primary bloodstream infections associated with a central venous catheter account for approximately 8.3% of HAIs in acute care hospitals (Magill, et al., 2014). In addition, CLABSI SIRs are higher among critical care units than among non-critical care wards (CDC, 2021a).
- **Findings:** In 2020, the CLABSI SIR was 1.1 in critical care units and 0.72 in wards. The 95% confidence intervals for all years follow:

  - Critical care units:

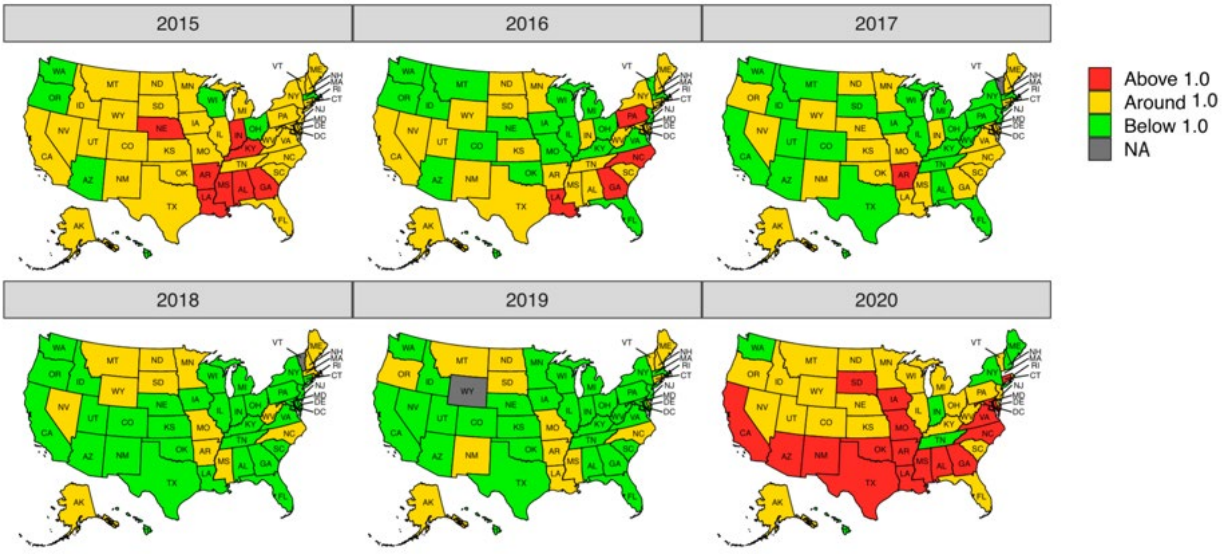
    - 2015, 0.981-1.021
    - 2016, 0.912-0.950
    - 2017, 0.848-0.885
    - 2018, 0.752-0.788
    - 2019, 0.715-0.750
    - 2020, 1.077-1.119

  - Wards:

    - 2015, 0.976-1.009
    - 2016, 0.861-0.892
    - 2017, 0.773-0.802
    - 2018, 0.711-0.739
    - 2019, 0.659-0.685
    - 2020, 0.704-0.732

State-Specific Infection Ratios for CLABSIs in Critical Care Units

State-specific distribution of SIRs for central line-associated bloodstream infections seen in critical care units by state, 2015-2020

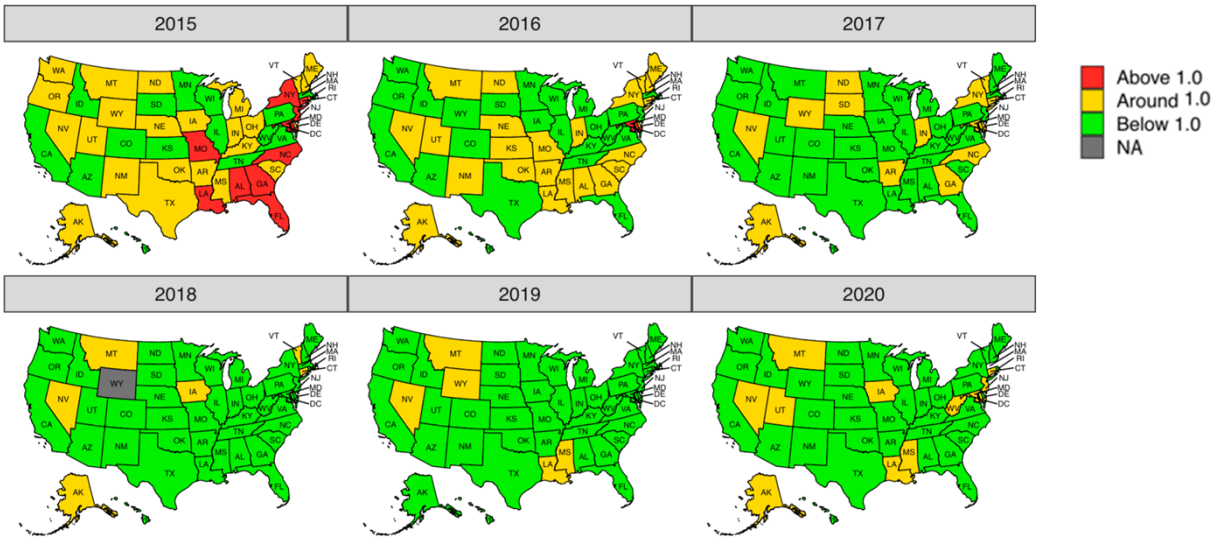


Source: Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, National and State Healthcare-Associated Infections Data Report, 2015-2020. https://www.cdc.gov/hai/data/portal/progress-report.html. Wyoming did not have data available for 2019. This measure is not included in the summary analysis.

- For CLABSIs seen in critical care units of acute care hospitals in 2020, state-specific SIRs ranged from 0.211 (minimum) to 2.036 (maximum).

State-Specific Distribution of Infection Ratios for CLABSIs in Wards

State-specific distribution of SIRs for central line-associated bloodstream infections seen on wards (non-critical care units) by state, 2015-2020

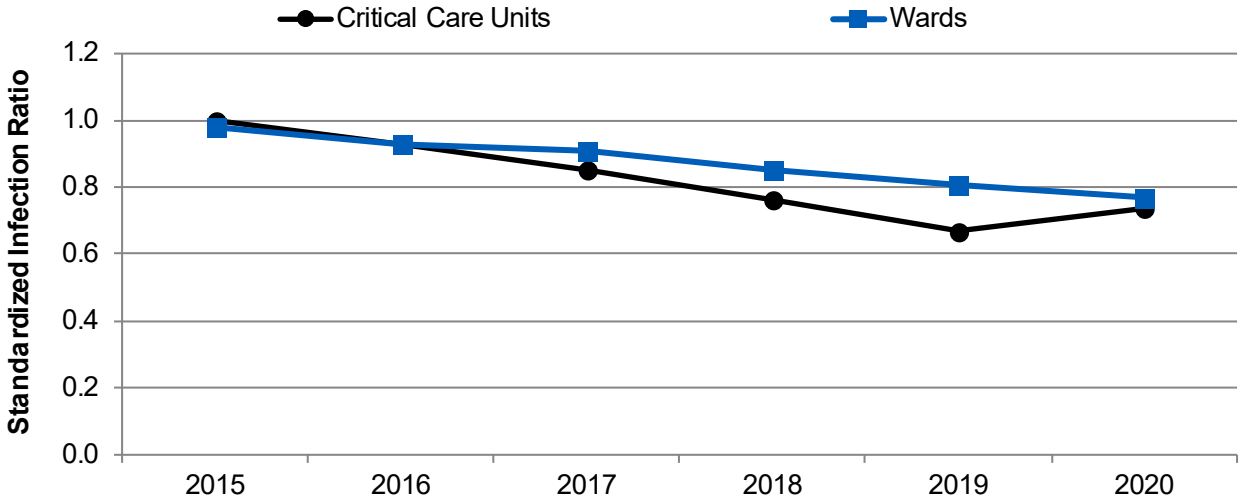


Source: Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, National and State Healthcare-Associated Infections Data Report, 2015-2020. https://www.cdc.gov/hai/data/portal/progress-report.html.
Note: SIRs below 1.0 are better. Wyoming did not have data available for 2018. This measure is not included in the summary analysis.

- For CLABSIs seen in non-critical care units of acute care hospitals in 2020, state-specific SIRs ranged from 0.211 (minimum) to 1.066 (maximum).

Standardized Infection Ratios for Catheter-Associated Urinary Tract Infections

National SIR for catheter-associated urinary tract infections seen in critical care units and wards (non-critical care units), 2015-2020

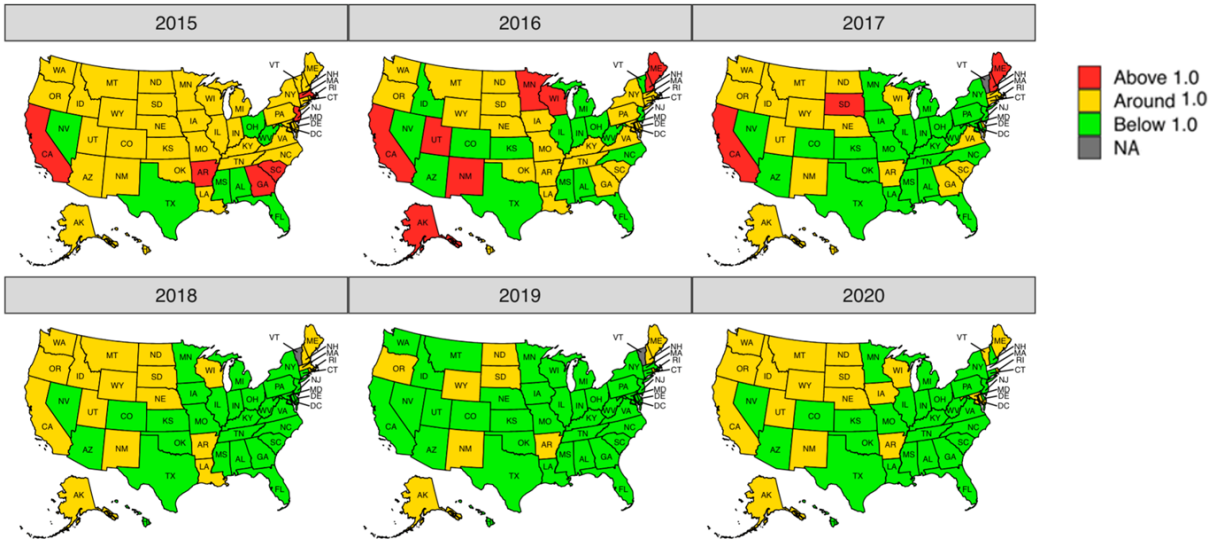


Source: Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, National and State Healthcare-Associated Infections Data Report, 2015-2020. https://www.cdc.gov/hai/data/portal/progress-report.html.
Note: SIRs below 1.0 are better. This measure is not included in the summary analysis.

- **Importance:** Compared with rates of other hospital-acquired infections, CAUTI rates vary more among units in the same hospital (Dudeck, et al., 2015). ICU patients differ from non-ICU patients in their underlying health status, their risks of contracting CAUTIs, and the consequences of CAUTIs that occur.
- **Findings:** In 2020, the CAUTI SIR was 0.74 in critical care units and 0.77 in wards. The 95% confidence intervals for all years follow:
  - Critical care units:
    - 2015, 0.986-1.019
    - 2016, 0.911-0.943
    - 2017, 0.834-0.866
    - 2018, 0.748-0.778
    - 2019, 0.656-0.684
    - 2020, 0.721-0.750
  - Wards:
    - 2015, 0.969-1.000
    - 2016, 0.918-0.949
    - 2017, 0.893-0.924
    - 2018, 0.836-0.867
    - 2019, 0.792-0.822
    - 2020, 0.758-0.788

State-Specific Infection Ratios for CAUTIs in Critical Care Units

State-specific distributions of SIRs for catheter-associated urinary tract infections seen in critical care units, 2015-2020

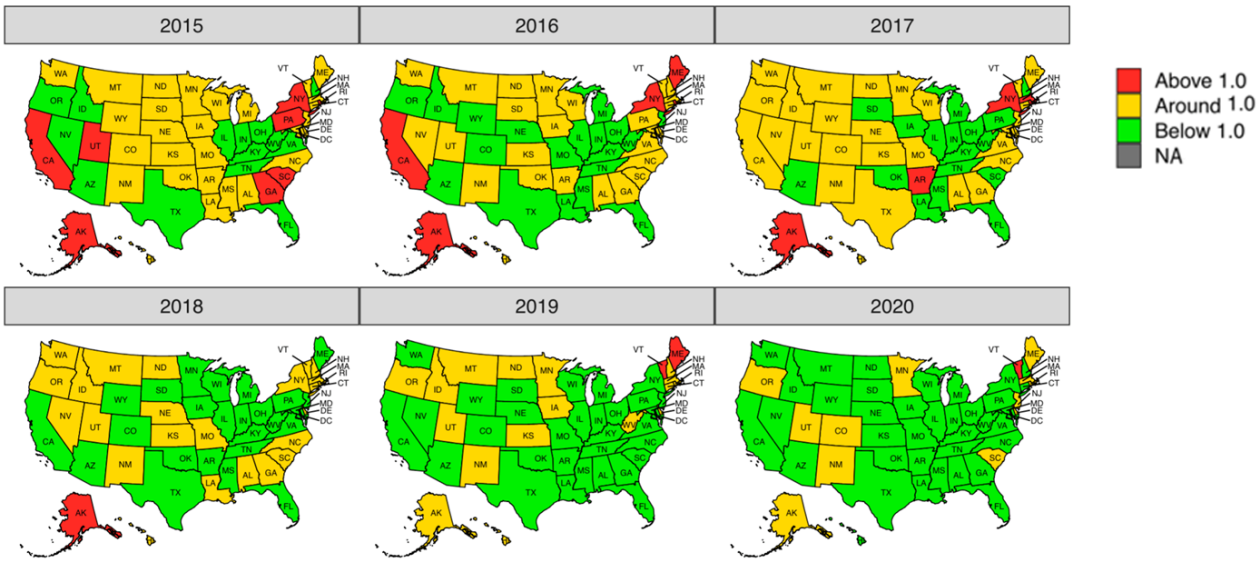


Source: Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, National and State Healthcare-Associated Infections Data Report, 2015-2020. http://www.cdc.gov/hai/data/portal/progress-report.html.
Note: SIRs below 1.0 are better. The SIR for Vermont was not calculated for this measure in 2017 or 2018, reducing the overall number of state-equivalent jurisdictions in the analysis from 52 to 51. This measure is not included in the summary analysis.

- For CAUTIs seen in critical care units of acute care hospitals in 2020, state-specific SIRs ranged from 0.272 (minimum) to 1.262 (maximum).

State-Specific Distribution of Infection Ratios for CAUTIs in Wards

State-specific distributions of SIRs for catheter-associated urinary tract Infections seen on wards (non-critical care units), 2015-2020

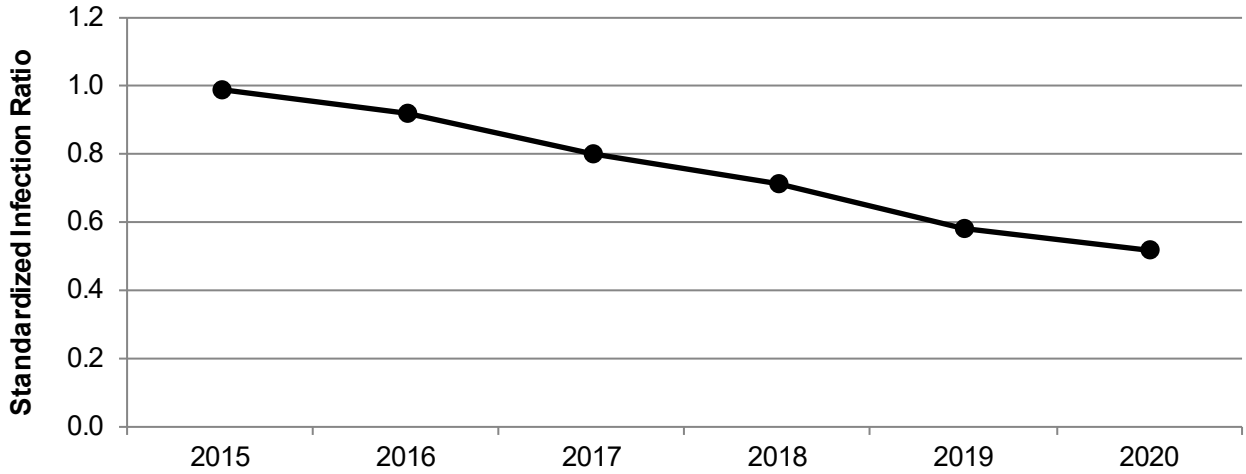


Source: Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, National and State Healthcare-Associated Infections Data Report, 2015-2020. https://www.cdc.gov/hai/data/portal/progress-report.html.
Note: SIRs below 1.0 are better. This measure is not included in the summary analysis.

- For CAUTIs seen on wards (non-critical care units) of acute care hospitals in 2020, state-specific SIRs ranged from 0.504 (minimum) to 1.746 (maximum).

Nationwide Infection Ratio for *Clostridioides difficile*

National SIR for hospital-onset *Clostridioides difficile* infections seen hospitalwide, 2015-2020



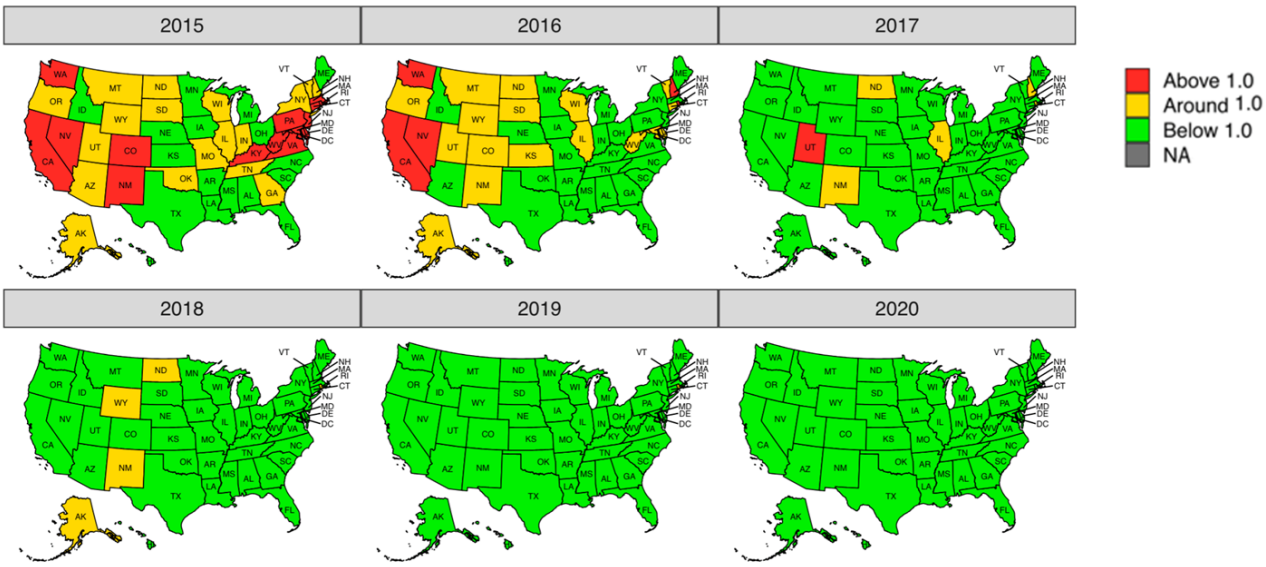
Source: Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, National and State Healthcare-Associated Infections Data Report, 2015-2020. https://www.cdc.gov/hai/data/portal/progress-report.html.
Note: SIRs below 1.0 are better. This measure is not included in the summary analysis.

- **Findings:** In 2020, the national *C. difficile* SIR was 0.518 hospitalwide. The 95% confidence intervals for all years follow:

  - 2015, 0.987-0.999
  - 2016, 0.915-0.926
  - 2017, 0.799-0.810
  - 2018, 0.706-0.716
  - 2019, 0.578-0.587
  - 2020, 0.513-0.523

State-Specific Infection Ratios for *C. difficile*

State-specific distributions of SIRs for hospital-onset *Clostridioides difficile* infections seen hospitalwide, 2015-2020



Source: Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, National and State Healthcare-Associated Infections Data Report, 2015-2020. https://www.cdc.gov/hai/data/portal/progress-report.html.
Note: SIRs below 1.0 are better. The SIR for Puerto Rico was not calculated for this measure in 2015-2018, reducing the overall number of state-equivalent jurisdictions in the analysis from 52 to 51 for all years. This measure is not included in the summary analysis.

- For hospital-onset *C. difficile* infection seen anywhere in the hospital in 2020, state-specific SIRs ranged from 0.13 (minimum) to 0.824 (maximum).

Tools for Reducing Central Line-Associated Bloodstream Infections in Hospitals

- **Purpose:** To help hospitals prevent CLABSIs and improve safety culture.
- **Methods:**

  - Implementing evidence-based practical resources and concepts from the Comprehensive Unit-based Safety Program (CUSP), available at https://www.ahrq.gov/hai/tools/clabsi-cauti-icu/index.html.
  - Implementing targeted decolonization for non-ICU patients with indwelling medical devices, available at https://www.ahrq.gov/hai/tools/abate/index.html.

- **Intended Users:** Hospital facilities.
- **Available Tools:** Checklists, preventable incidence calculators, audit forms, event report templates.
- **Potential Measures of Effectiveness:**
  - Number of CLABSIs attributable to each unit per month
  - Days since last CLABSI
- **Impact:** Through use of the CUSP toolkit and CLABSI tools, more than 100 hospital intensive care units (ICUs) in Michigan nearly eliminated CLABSIs. Nationwide, the use of this toolkit helped more than 1,100 hospital ICUs reduce rates of CLABSI by 40% in aggregate. More information is available at https://www.ahrq.gov/workingforquality/priorities-in-action/michigan-health-and-hospital-association-keystone-center.html.

Tools for Reducing Catheter-Associated Urinary Tract Infections in Hospitals

- **Purpose:** To help hospitals prevent CAUTIs and improve safety culture.
- **Methods:** Implementing evidence-based practical resources and concepts from the Comprehensive Unit-based Safety Program (CUSP).
- **Intended Users:** Hospital facilities.
- **Available Tools**: Guides, checklists, webinars, learning modules, data interpretation guides.
- **Link:** https://www.ahrq.gov/hai/tools/clabsi-cauti-icu/index.html
- **Potential Measures of Effectiveness:**
  - Number of symptomatic CAUTIs attributable to each unit per month
  - Days since last CAUTI
- **Impact:** Use of the CUSP for CAUTI toolkit helped more than 700 hospital non-ICU units reduce rates of CAUTI by 30%.

Tools for Reducing Device-Associated Bloodstream Infections in Hospitals

- **Purpose:** To help hospitals prevent bloodstream infections in inpatients with indwelling devices.
- **Methods:** Implementing evidence-based, practical resources developed during and after the NIH-sponsored ABATE (**A**ctive **Bat**hing to **E**liminate) Infection Trial.
- **Intended Users:** Hospital facilities.
- **Available Tools:** Written materials, videos, and patient- and staff-oriented handouts providing guidance on using chlorhexidine gluconate (CHG) antiseptic soap to clean the areas around the entry points of specific medical devices, namely central and midline catheters and lumbar drains.
- **Link:** https://www.ahrq.gov/hai/tools/abate/index.html
- **Potential Measures of Effectiveness:**
  - Number of bloodstream infections attributable to patients with target devices in each unit per month
  - Days since last bloodstream infection attributable to a patient with a target device

- **Impact:** During the ABATE Infection Trial, a protocol involving CHG use was found to reduce bloodstream infections by more than 30% in adult inpatients who were not in intensive care units and who had specific medical devices.

Maternal Morbidity and Mortality

Maternal mortality, defined as the risk of dying from causes associated with childbirth, is considered a sentinel event in that it is a rare and negative maternal outcome (Adams, et al., 2009). The United States has one of the highest maternal mortality rates compared with other high-income industrialized countries, with 17.4 deaths per 100,000 live births in 2018 (CDC, 2020a). About 700 women die from pregnancy-related complications annually. One-third of pregnancy-related deaths occur 1 week to 1 year after delivery. Three in five pregnancy-related deaths are preventable (CDC, 2019).

Persistent racial and ethnic disparities in maternal mortality have also accompanied the rise in maternal deaths. Black women have a pregnancy-related mortality rate 3 times as high as that of non-Hispanic White women (Petersen, et al., 2019).

Like maternal mortality, severe maternal morbidity, which encompasses unintended outcomes of labor and delivery that result in short-term or long-term health issues, has similarly increased in the United States in recent decades (ACOG, Kilpatrick, & Ecker, 2016).

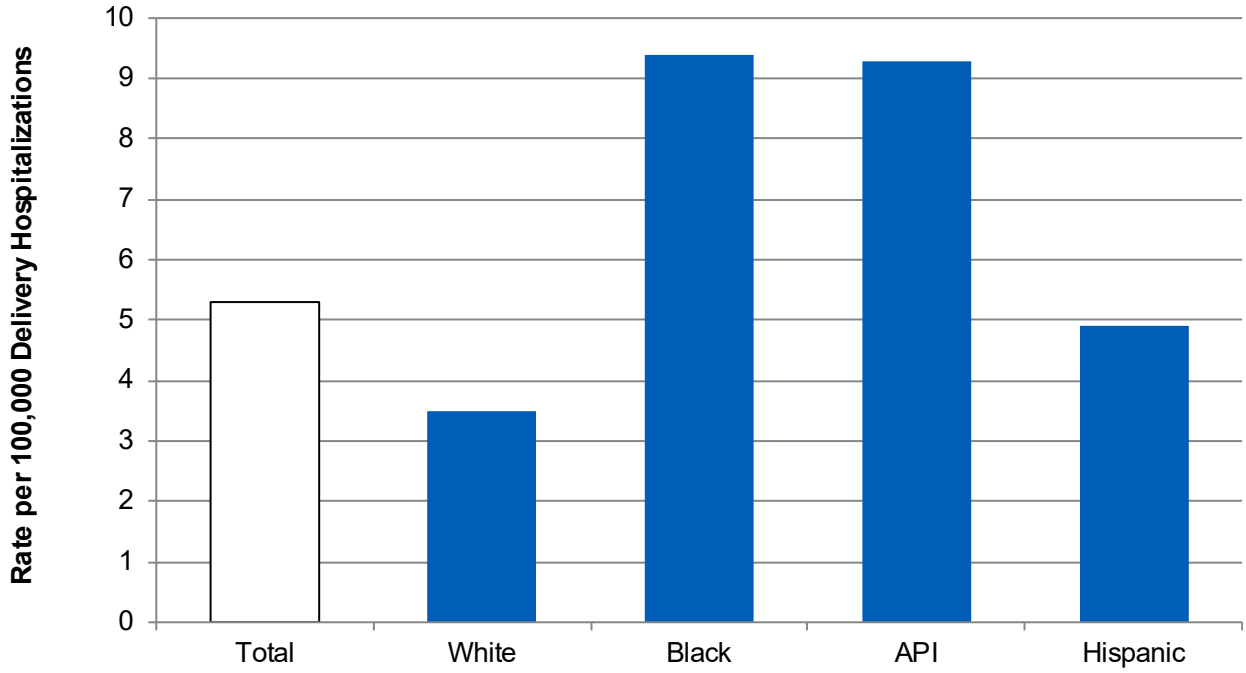
Many cases of maternal morbidity and mortality are potentially preventable. Factors that contribute to these events have been categorized at the patient, provider, health facility, and system level (Petersen, et al., 2019).

Maternal morbidity and mortality measures include:

- In-hospital deaths per 100,000 delivery hospitalizations.
- Severe maternal morbidity per 1,000 delivery hospitalizations.
- Severe postpartum hemorrhage per 1,000 delivery hospitalizations.
- Preeclampsia or eclampsia per 1,000 delivery hospitalizations.
- Venous thromboembolism or pulmonary embolism per 1,000 delivery discharges.
- Cesarean delivery of low-risk first births.

In-Hospital Maternal Deaths, by Race/Ethnicity

In-hospital deaths per 100,000 delivery hospitalizations, females ages 12-55, by race/ethnicity, 2019

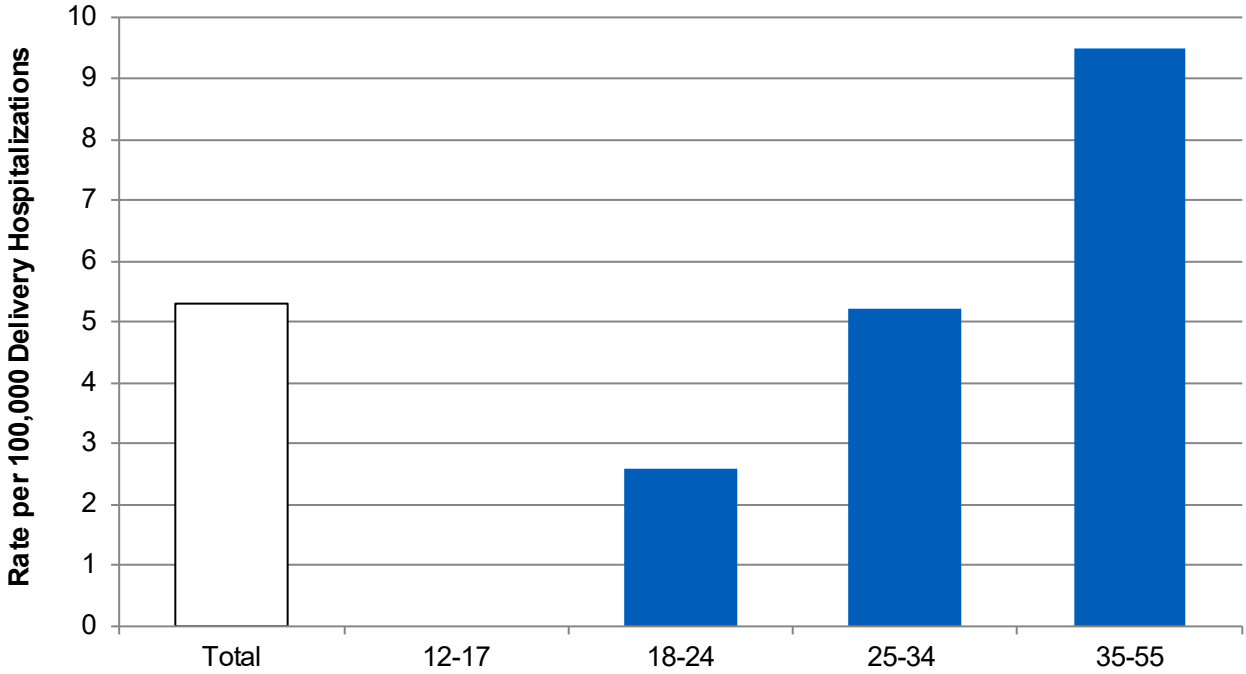


Key: API = Asian or Pacific Islander.
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Includes deliveries with any delivery diagnosis, procedure, or diagnosis-related group and not abortion.
Note: For this measure, lower rates are better. White, Black, and API are non-Hispanic. Hispanic includes all races. This measure is not included in the summary analysis.

- **Importance:** Pregnancy-related mortality in the United States rose from 7.2 deaths per 100,000 live births in 1987 to 17.3 deaths per 100,000 live births in 2017 (CDC, 2020b). Severe maternal morbidity, including mortality, disproportionately affects minority and low-income women (Fingar, et al., 2018). About one-third of pregnancy-related deaths occur at delivery or within 1 week of delivery. Maternal deaths that occur during hospital stays may provide a window into both system and provider-level factors that can play a role in preventing maternal death (CDC, 2019).
- **Groups With Disparities:**
  - In-hospital deaths were almost three times as high among Black females and Asian and Pacific Islander (API) females compared with White females (9.4 and 9.3, respectively, vs. 3.5 per 100,000 delivery hospitalizations).
  - In-hospital deaths were higher among Hispanic females compared with White females (4.9 vs. 3.5 per 100,000 delivery hospitalizations).

In-Hospital Maternal Deaths, by Age

In-hospital deaths per 100,000 delivery hospitalizations, females ages 12-55, by age, 2019

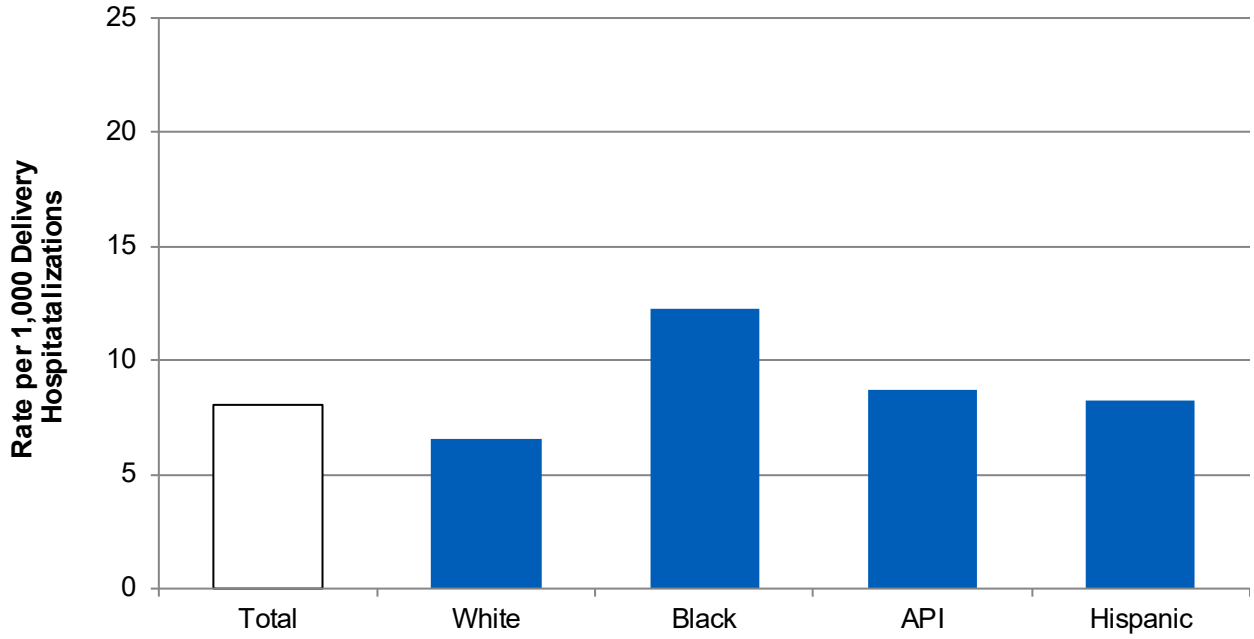


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Includes deliveries with any delivery diagnosis, procedure, or diagnosis-related group and not abortion.
Note: No in-hospital deaths were reported among females ages 12-17. For this measure, lower rates are better. This measure is not included in the summary analysis.

- **Importance:** About one-third of pregnancy-related deaths occur at delivery or within 1 week of delivery. Maternal deaths that occur during hospital stays may provide a window into both system and provider-level factors that can play a role in preventing maternal death (CDC, 2019).
- **Groups With Disparities:**
  - Compared with females ages 18-24, females ages 25-34 were twice as likely to die during a delivery hospitalization (5.2 vs. 2.6 per 100,000 delivery hospitalizations).
  - Compared with females ages 18-24, females ages 35-55 were more than three times as likely to die during a delivery hospitalization (9.5 vs. 2.6 per 100,000 delivery hospitalizations).
  - Compared with females ages 12-17, females ages 18-24, 25-34, and 35-55 were all more likely to die during delivery hospitalization (2.6, 5.2, and 9.5, respectively, vs. 0.0).

Severe Maternal Morbidity, by Race/Ethnicity

Severe maternal morbidity per 1,000 delivery hospitalizations, females ages 12-55, by ethnicity, 2019

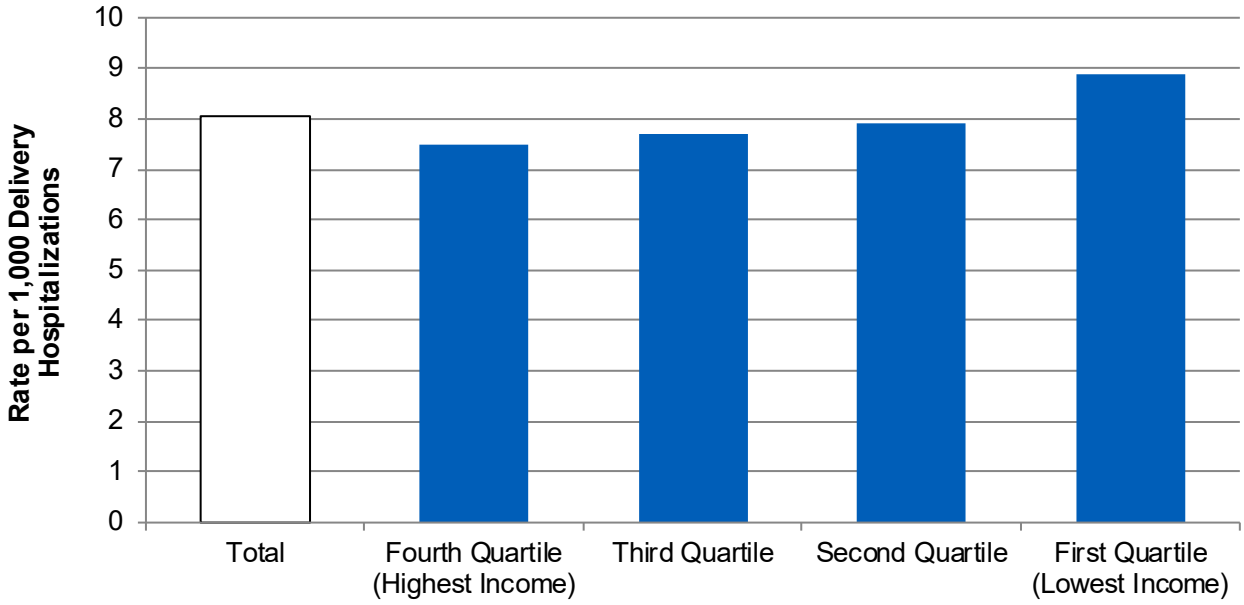


Key: API = Asian or Pacific Islander.
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of severe maternal morbidity as defined by the Centers for Disease Control and Prevention. Refer to "How Does CDC Identify Severe Maternal Morbidity?" at https://www.cdc.gov/reproductivehealth/maternalinfanthealth/smm/severe-morbidity-ICD.htm.
Note: For this measure, lower rates are better. White, Black, and API are non-Hispanic. Hispanic includes all races. This measure is not included in the summary analysis.

- **Importance:** Like maternal mortality, severe maternal morbidity, which encompasses unintended outcomes of labor and delivery that result in short-term or long-term health issues, has increased in the United States in recent decades. The perinatal period presents unique patient safety challenges, including potential overuse and underuse of interventions, misdiagnosis, and emotional harm, which contribute to maternal morbidity and perinatal adverse events (AHRQ, 2019d).
- **Groups With Disparities:**
  - In 2019, Black females were more likely to experience severe maternal morbidity compared with White females (12.3 vs. 6.6 per 1,000 delivery hospitalizations).
  - In 2019, API females were more likely to experience severe maternal morbidity compared with White females (8.7 vs. 6.6 per 1,000 delivery hospitalizations).
  - In 2019, Hispanic females were more likely to experience severe maternal morbidity compared with White females (8.2 vs. 6.6 per 1,000 delivery hospitalizations).

Severe Maternal Morbidity, by Income

Severe maternal morbidity per 1,000 delivery hospitalizations, females ages 12-55, by median income of patient's ZIP Code, 2019

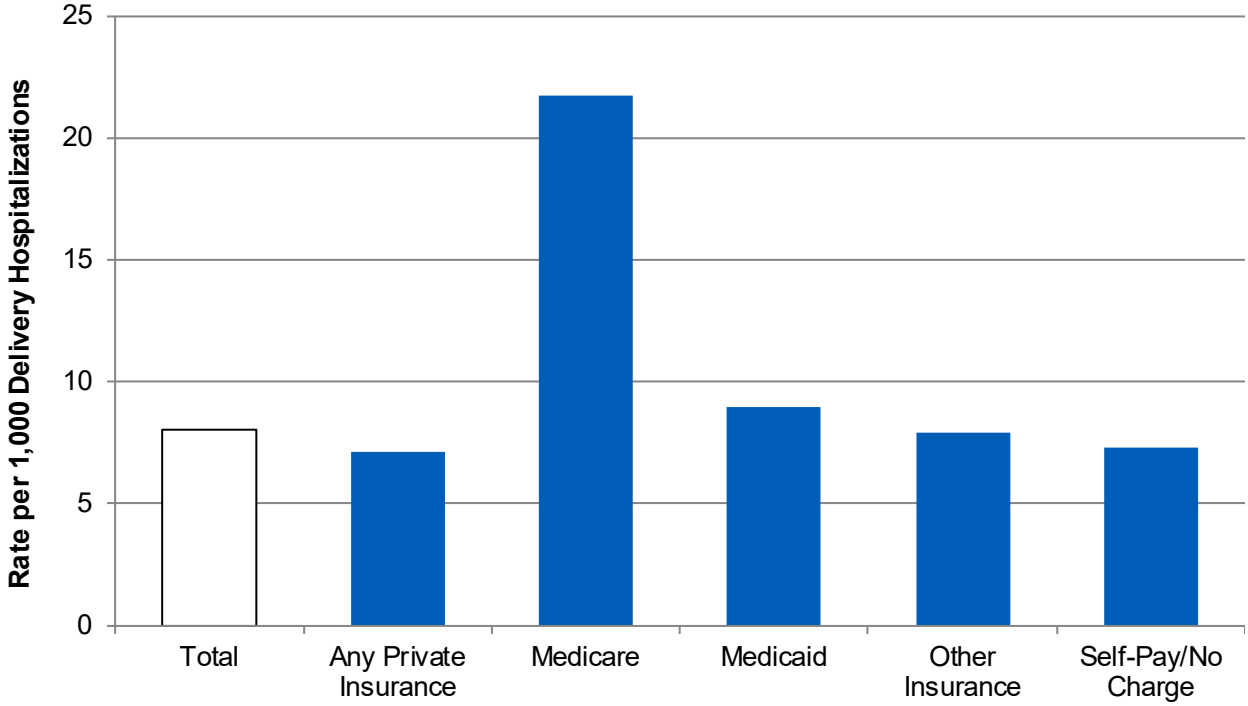


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of severe maternal morbidity as defined by the Centers for Disease Control and Prevention. Refer to "How Does CDC Identify Severe Maternal Morbidity?" at https://www.cdc.gov/reproductivehealth/maternalinfanthealth/smm/severe-morbidity-ICD.htm.
Note: For this measure, lower rates are better. First Quartile indicates that the median household income of the patient's ZIP Code falls in the lowest quartile nationally. Fourth Quartile indicates that the median household income of the patient's ZIP Code falls in the highest quartile nationally. Income is based on the federal poverty guideline (PG): first quartile = <100% of PG; second quartile = 100-199% of PG; third quartile = 200-399% of PG; fourth quartile = 400%+ of PG. This measure is not included in the summary analysis.

- **Importance:** Like maternal mortality, severe maternal morbidity, which encompasses unintended outcomes of labor and delivery that result in short-term or long-term health issues, has increased in the United States in recent decades. The perinatal period presents unique patient safety challenges, including potential overuse and underuse of interventions, misdiagnosis, and emotional harm, which contribute to maternal morbidity and perinatal adverse events (AHRQ, 2019d).
- **Groups With Disparities:**
  - In 2019, females in households with the lowest income were more likely to experience severe maternal morbidity compared with females in households with the highest income (8.9 vs. 7.5 per 1,000 delivery hospitalizations).
  - Females in households with incomes in the second, third, and fourth quartiles all experienced similar rates of severe maternal morbidity (7.9, 7.7, and 7.5 respectively).

Severe Maternal Morbidity, by Payment Source

Severe maternal morbidity per 1,000 delivery hospitalizations, females ages 12-55, by payment source, 2019

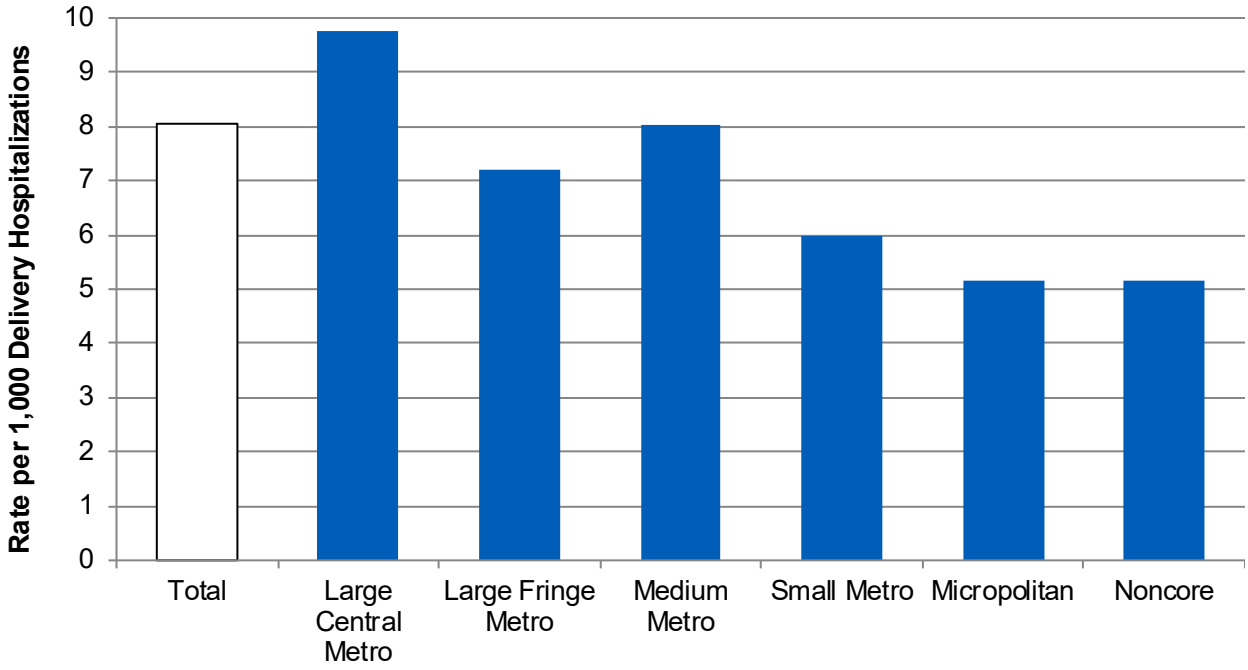


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of severe maternal morbidity as defined by the Centers for Disease Control and Prevention. Refer to "How Does CDC Identify Severe Maternal Morbidity?" at https://www.cdc.gov/reproductivehealth/maternalinfanthealth/smm/severe-morbidity-ICD.htm.
Note: For this measure, lower rates are better. This measure is not included in the summary analysis.S

- **Groups With Disparities:**
  - In 2019, females paying with Medicare were more likely to experience severe maternal morbidity compared with females paying with any private insurance (21.8 vs. 7.1 per 1,000 delivery hospitalizations).
  - In 2019, females paying with Medicaid were more likely to experience severe maternal morbidity compared with females paying with any private insurance (9.0 vs. 7.1 per 1,000 delivery hospitalizations).
  - In 2019, females paying with any private insurance, other insurance, or self-pay/no charge had similar rates of severe maternal morbidity (7.1, 7.9, and 7.3, respectively).

Severe Maternal Morbidity, by Location of Residence

Severe maternal morbidity per 1,000 delivery hospitalizations, females ages 12-55, by location of residence, 2019

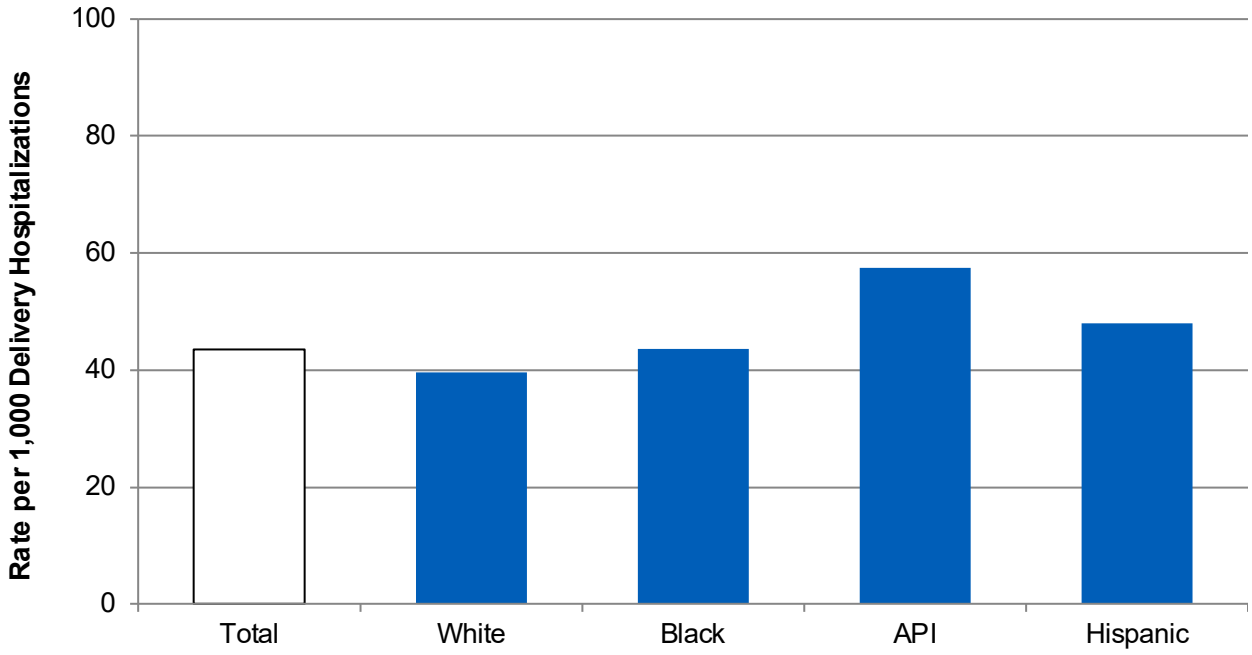


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of severe maternal morbidity as defined by the Centers for Disease Control and Prevention. Refer to "How Does CDC Identify Severe Maternal Morbidity?" at https://www.cdc.gov/reproductivehealth/maternalinfanthealth/smm/severe-morbidity-ICD.htm.
Note: For this measure, lower rates are better. The 2013 NCHS Urban–Rural Classification Scheme for Counties (https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf) has more information on location of residence. This measure is not included in the summary analysis.

- **Groups With Disparities:**
  - In 2019, females living in large central metro counties were more likely to experience severe maternal morbidity compared with females living in small metro counties (9.8 vs. 6.0 per 1,000 delivery hospitalizations).
  - In 2019, females living in large fringe metro counties were more likely to experience severe maternal morbidity compared with females living in small metro counties (7.2 vs. 6.0 per 1,000 delivery hospitalizations).
  - In 2019, females living in medium metro counties were more likely to experience severe maternal morbidity compared with females living in large fringe metro counties (8.0 vs. 7.2 per 1,000 delivery hospitalizations).

Severe Postpartum Hemorrhage, by Race/Ethnicity

Severe postpartum hemorrhage per 1,000 delivery hospitalizations, females ages 12-55, by race/ethnicity, 2019

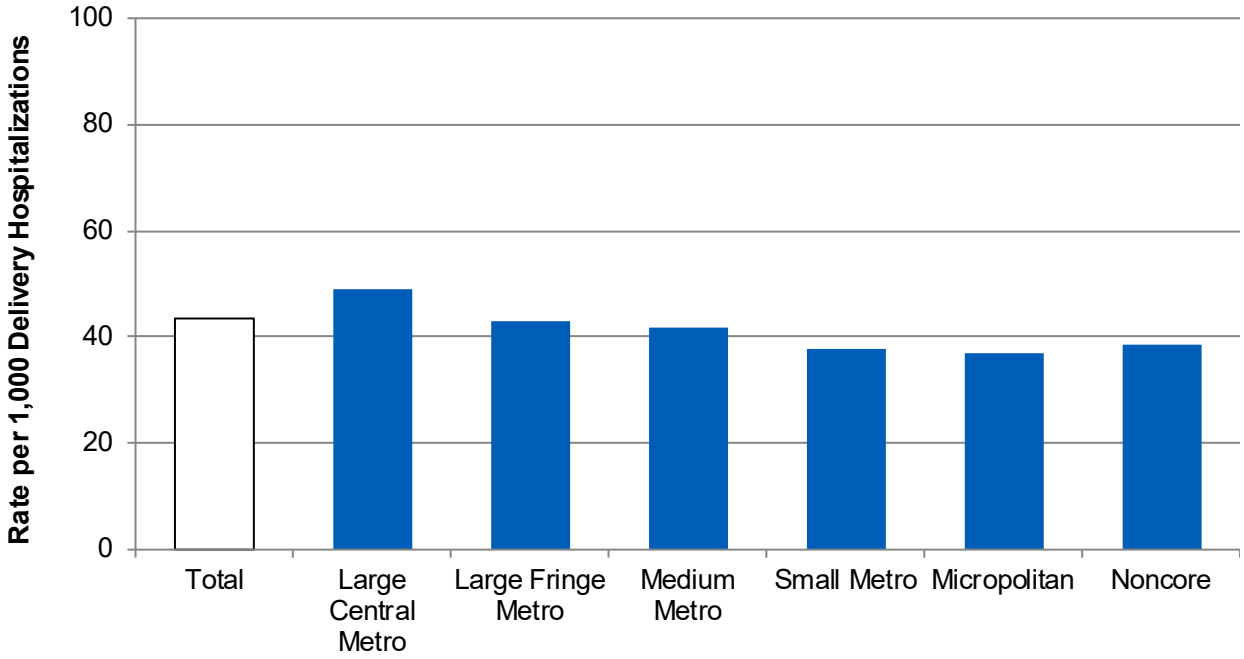


Key: API = Asian or Pacific Islander.
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of postpartum hemorrhage.
Note: For this measure, lower rates are better. White, Black, and API are non-Hispanic. Hispanic includes all races. This measure is not included in the summary analysis.

- **Importance:** Postpartum hemorrhage refers to heavy bleeding after a vaginal delivery that does not slow or stop. Females who experience postpartum hemorrhage may have a drop in blood pressure. They may experience postpartum hemorrhage rapidly, which can lead to death (Ngwenya, 2016). Females of color experience higher rates of postpartum hemorrhage (Gyamfi-Bannerman, et al., 2018).
- **Groups With Disparities:**
  - In 2019, Black females were more likely to experience severe postpartum hemorrhage compared with White females (43.5 vs. 39.6 per 1,000 delivery hospitalizations).
  - In 2019, API females were more likely to experience severe postpartum hemorrhage compared with White females (57.3 vs. 39.6 per 1,000 delivery hospitalizations).
  - In 2019, Hispanic females were more likely to experience severe postpartum hemorrhage compared with White females (48.0 vs. 39.6 per 1,000 delivery hospitalizations).

Severe Postpartum Hemorrhage, by Location of Residence

Severe postpartum hemorrhage per 1,000 delivery hospitalizations, females ages 12-55, by location of residence, 2019

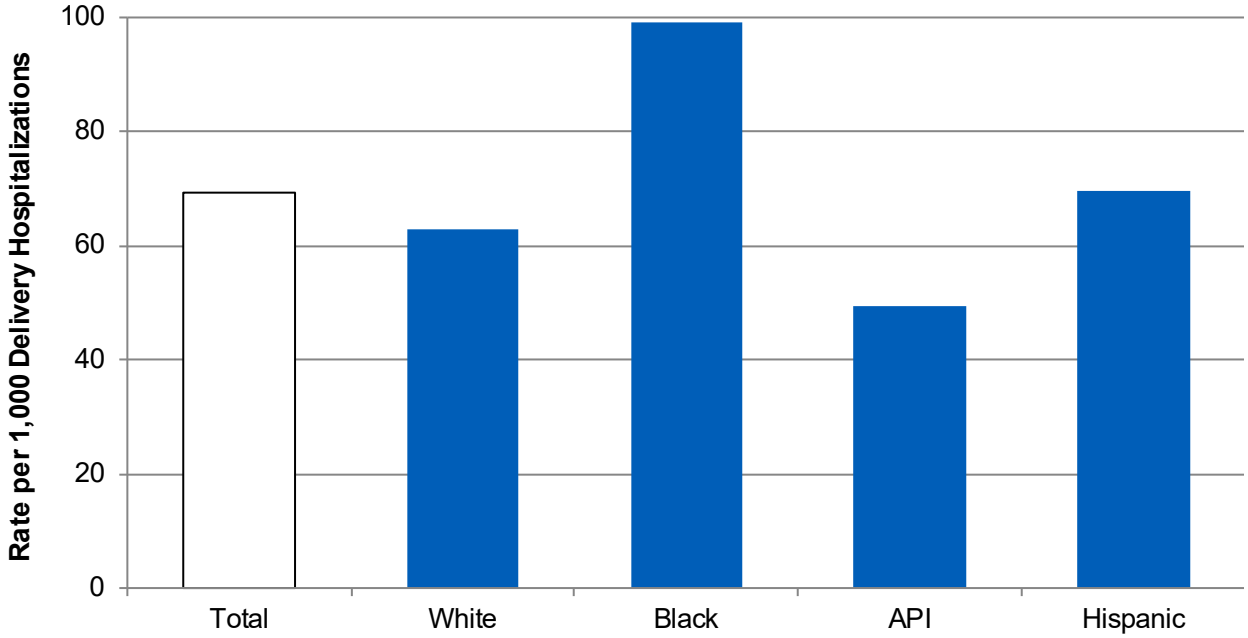


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of postpartum hemorrhage.
Note: For this measure, lower rates are better. The 2013 Urban–Rural Classification Scheme for Counties (https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf) has more information on location of residence. This measure is not included in the summary analysis.

- **Importance:** Postpartum hemorrhage refers to heavy bleeding after a vaginal delivery that does not slow or stop. Females who experience postpartum hemorrhage may have a drop in blood pressure. They may experience postpartum hemorrhage rapidly, which can lead to death (Ngwenya, 2016). Females of color experience higher rates of postpartum hemorrhage (Gyamfi-Bannerman, et al., 2018).
- **Groups With Disparities:**
  - In 2019, females living in large central metro counties were more likely to experience severe postpartum hemorrhage compared with females living in large fringe metro counties (49.0 vs. 42.8 per 1,000 delivery hospitalizations).
  - In 2019, females living in small metro counties were less likely to experience severe postpartum hemorrhage compared with females living in large fringe metro counties (37.6 vs. 42.8 per 1,000 delivery hospitalizations).

Preeclampsia or Eclampsia, by Race/Ethnicity

Preeclampsia or eclampsia per 1,000 delivery hospitalizations, females ages 12-55, by race/ethnicity, 2019

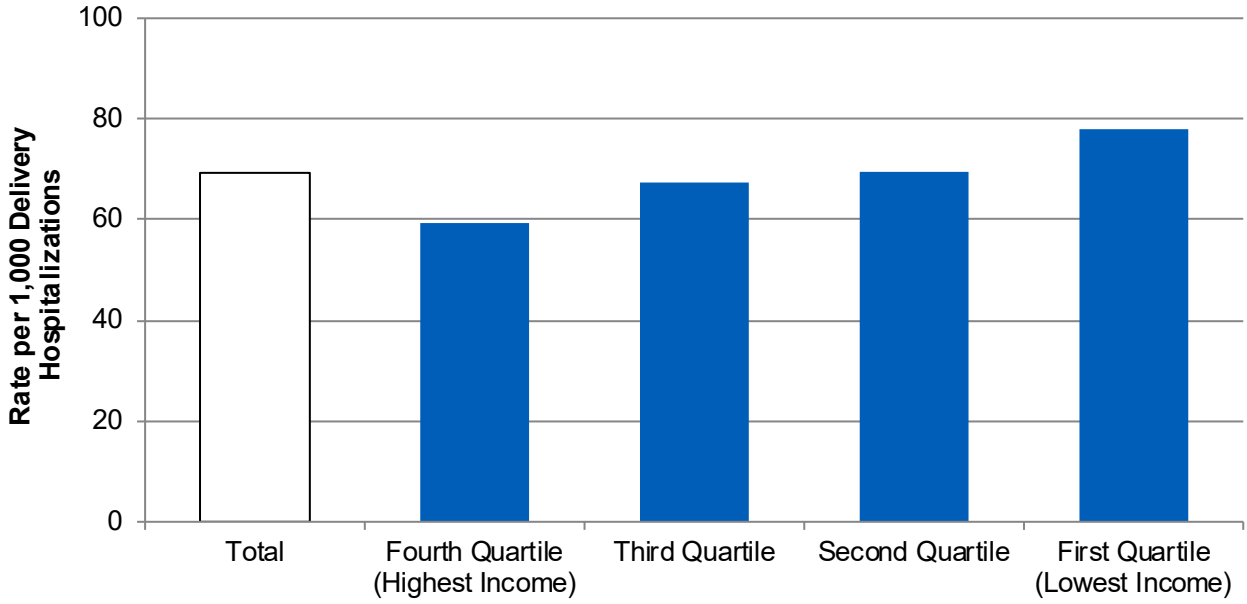


Key: API = Asian or Pacific Islander.
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of preeclampsia or eclampsia.
Note: For this measure, lower rates are better. White, Black, and API are non-Hispanic. Hispanic includes all races. This measure is not included in the summary analysis.

- **Importance:** High blood pressure occurs in 1 in every 12-17 pregnancies among women ages 22-44 years (Bateman, et al., 2012). Complications due to high blood pressure can result in preeclampsia (untreated high blood pressure that may result in organ damage) or eclampsia (onset of seizures or a coma in women with preeclampsia) (Medline Plus, 2021a, 2021b).
- **Groups With Disparities:**
  - In 2019, preeclampsia or eclampsia was more common among Black females compared with White females (99.2 vs. 62.8 per 1,000 delivery hospitalizations).
  - In 2019, preeclampsia or eclampsia was less common among API females compared with White females (49.3 vs. 62.8 per 1,000 delivery hospitalizations).
  - In 2019, preeclampsia or eclampsia was more common among Hispanic females compared with White females (69.7 vs. 62.8 per 1,000 delivery hospitalizations).

Preeclampsia or Eclampsia, by Income

Preeclampsia or eclampsia per 1,000 delivery hospitalizations, females ages 12-55, by median income of patient's ZIP Code, 2019

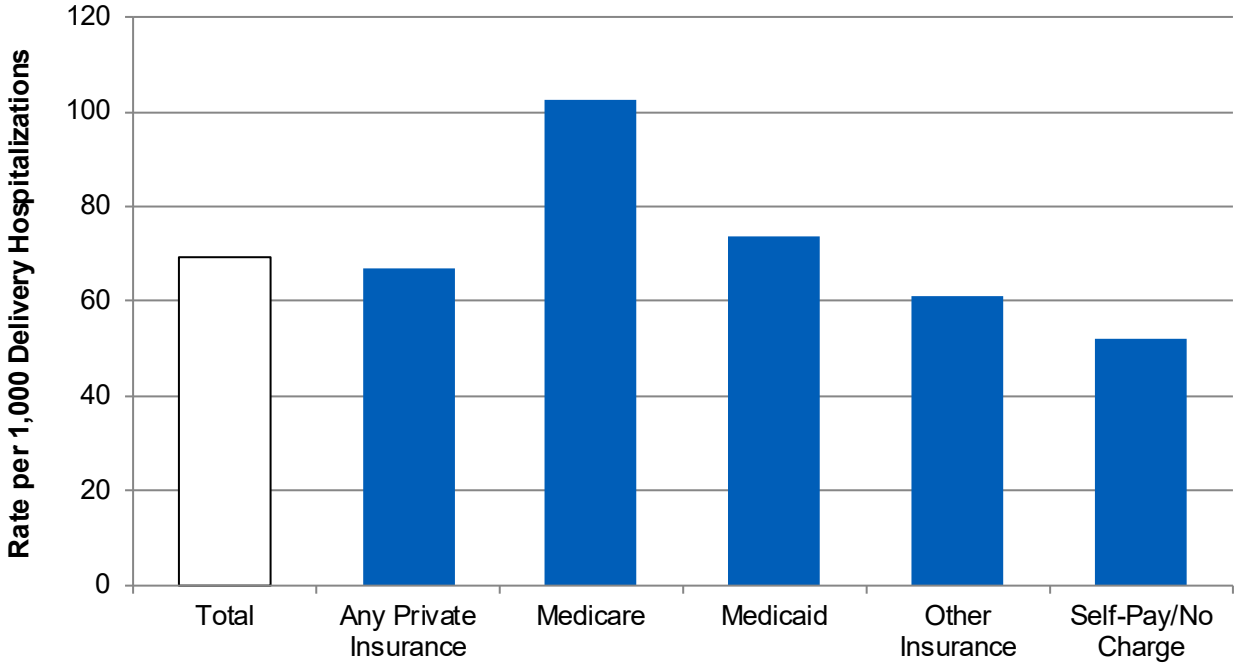


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of preeclampsia or eclampsia.
Note: For this measure, lower rates are better. First Quartile indicates that the median household income of the patient's ZIP Code falls in the lowest quartile nationally. Fourth Quartile indicates that the median household income of the patient's ZIP Code falls in the highest quartile nationally. Income is based on the federal poverty guideline (PG): first quartile = <100% of PG; second quartile = 100-199% of PG; third quartile = 200-399% of PG; fourth quartile = 400%+ of PG. This measure is not included in the summary analysis.

- **Importance:** High blood pressure occurs in 1 in every 12-17 pregnancies among women ages 22-44 years (Bateman, et al., 2012). Complications due to high blood pressure can result in preeclampsia (untreated high blood pressure that may result in organ damage) or eclampsia (the onset of seizures or a coma in women with preeclampsia) (Medline Plus, 2021a, 2021b).
- **Groups With Disparities:**
  - In 2019, preeclampsia or eclampsia was more common among females in households in the third income quartile compared with females in households in the highest income quartile (67.4 vs. 59.3 per 1,000 delivery hospitalizations).
  - In 2019, preeclampsia or eclampsia was more common among females in households in the second income quartile compared with females in households in the highest income quartile (69.7 vs. 59.3 per 1,000 delivery hospitalizations).
  - In 2019, preeclampsia or eclampsia was more common among females in households in the lowest income quartile compared with females in households in the highest income quartile (78 vs. 59.3 per 1,000 delivery hospitalizations).

Preeclampsia or Eclampsia, by Payment Source

Preeclampsia or eclampsia per 1,000 delivery hospitalizations, females ages 12-55, by payment source, 2019

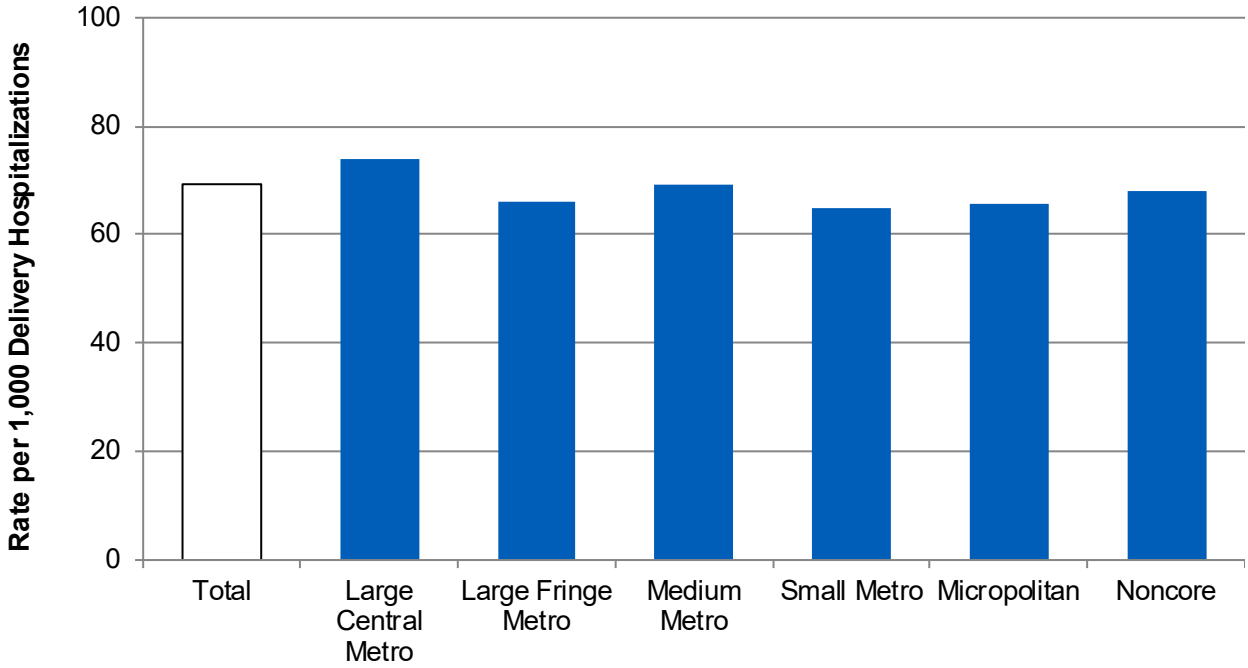


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of preeclampsia or eclampsia.
Note: For this measure, lower rates are better. This measure is not included in the summary analysis.

- **Groups With Disparities:**
  - In 2019, preeclampsia or eclampsia was more common among females paying with Medicare compared with females paying with any private insurance (102.7 vs. 66.9 per 1,000 delivery hospitalizations).
  - In 2019, preeclampsia or eclampsia was more common among females paying with Medicaid compared with females paying with any private insurance (73.5 vs. 66.9 per 1,000 delivery hospitalizations).
  - In 2019, preeclampsia or eclampsia was more common among females paying with any private insurance and females paying with other insurance compared with females paying with self-pay/no charge (66.9 and 61.0, respectively, vs. 52.0 per 1,000 delivery hospitalizations).

Preeclampsia or Eclampsia, by Location of Residence

Preeclampsia or eclampsia per 1,000 delivery hospitalizations, females ages 12-55, by location of residence, 2019

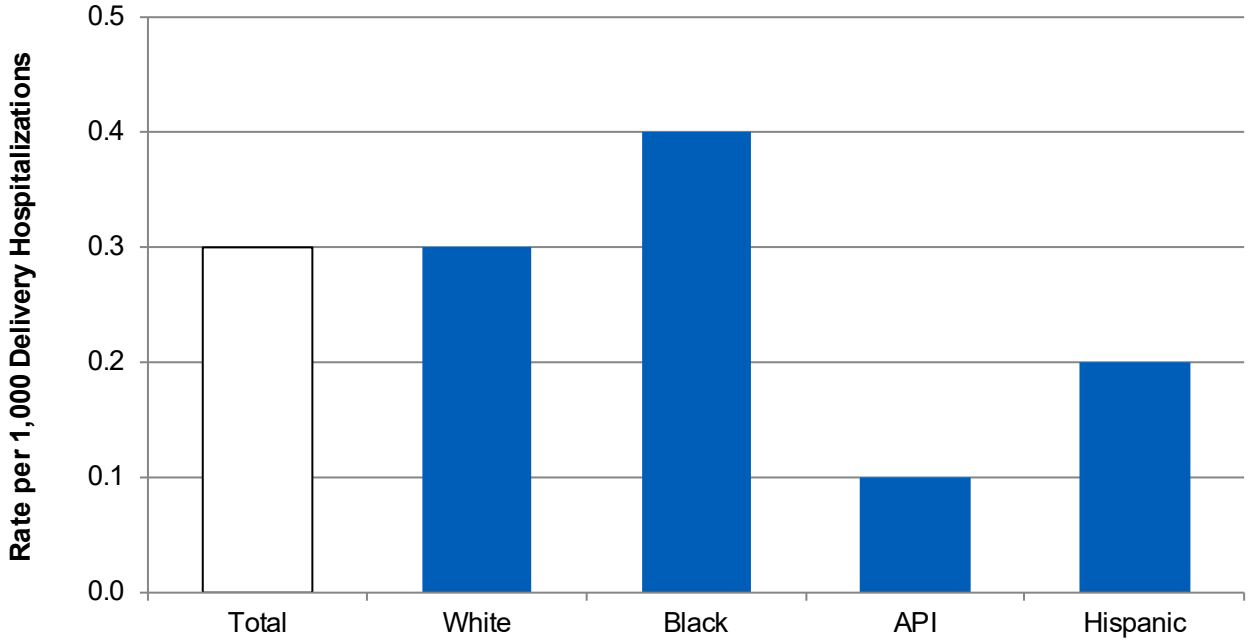


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Inpatient stays for females ages 12-55 with any delivery diagnosis, procedure, or diagnosis-related group, excluding those with any indication of abortion.
Numerator: Subset of the denominator with any diagnosis of preeclampsia or eclampsia.
Note: For this measure, lower rates are better. The 2013 Urban–Rural Classification Scheme for Counties (https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf) has more information on location of residence. This measure is not included in the summary analysis.

- **Groups With Disparities:**
  - In 2019, preeclampsia or eclampsia was more common among females residing in large central metro counties compared with females residing in large fringe metro counties (73.9 vs. 66.2 per 1,000 delivery hospitalizations).
  - In 2019, preeclampsia or eclampsia was more common among females residing in medium metro counties compared with females residing in large fringe metro counties (69.2 vs. 66.2 per 1,000 delivery hospitalizations).
  - In 2019, females living in large fringe metro, small metro, and micropolitan all experienced similar rates of preeclampsia or eclampsia (66.2, 64.7, and 65.7 per 1,000 delivery hospitalizations, respectively).

Venous Thromboembolism or Pulmonary Embolism, by Race/Ethnicity

Venous thromboembolism or pulmonary embolism per 1,000 delivery discharges, females ages 12-55, by race/ethnicity, 2019

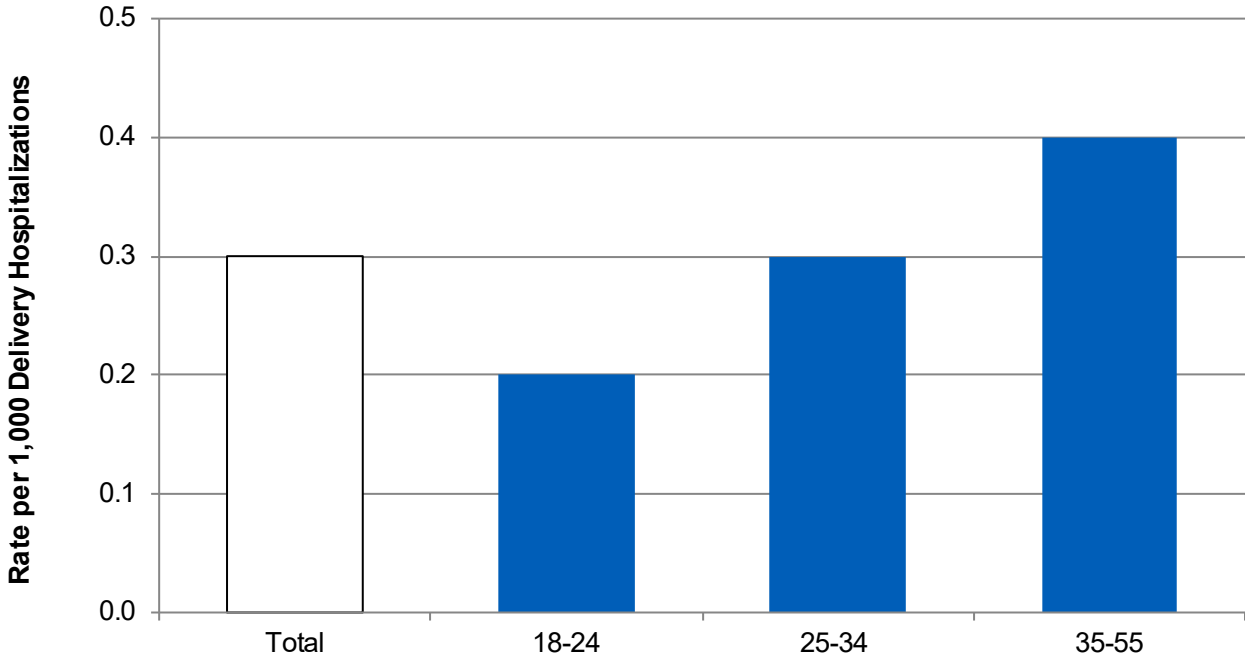


Key: API = Asian or Pacific Islander.
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Includes deliveries with any delivery diagnosis, procedure, or diagnosis-related group and not abortion.
Note: For this measure, lower rates are better. White, Black, and API are non-Hispanic. Hispanic includes all races. This measure is not included in the summary analysis.

- **Importance:** Venous thromboembolism (VTE), which includes deep vein thrombosis and pulmonary embolism (PE), is the development of blood clots. It is one cause of pregnancy-related mortality. Deaths due to PE account for 9.2% of all pregnancy-related deaths or approximately 1.5 deaths per 100,000 live births (Abe, et al., 2019). Reductions in VTE and PE could save lives.
- **Groups With Disparities:**
  - Hispanic females were less likely to experience VTE/PE during a delivery hospitalization than White females (0.2 vs. 0.3 per 1,000 delivery discharges).
  - API females also had a lower VTE/PE rate than White females (0.1 vs. 0.3 per 1,000 delivery discharges).
  - Black females, however, were more likely than White females to experience VTE/PE (0.4 vs. 0.3 per 1,000 delivery discharges).

Venous Thromboembolism or Pulmonary Embolism, by Age

Venous thromboembolism or pulmonary embolism per 1,000 delivery discharges, females ages 12-55, by age, 2019

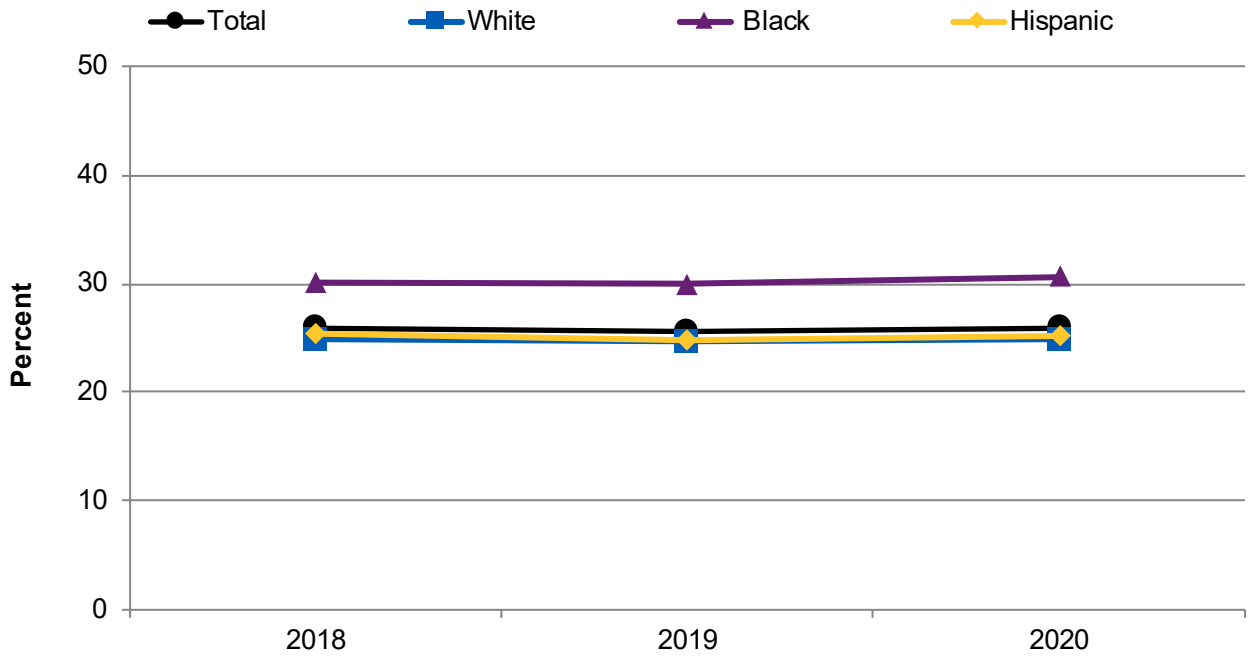


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project, State Inpatient Databases, weighted to provide national estimates; and AHRQ Quality Indicators, v2020.1. More information is in *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the 2022 National Healthcare Quality and Disparities Report* (https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp).
Denominator: Includes deliveries with any delivery diagnosis, procedure, or diagnosis-related group and not abortion.
Note: For this measure, lower rates are better. Data do not meet the criteria for statistical reliability, data quality, or confidentiality for the group ages 12-17. This measure is not included in the summary analysis.

- **Groups With Disparities:**
  - Compared with females ages 18-24, females ages 25-34 were more likely to experience VTE/PE (0.3 vs. 0.2 per 1,000 delivery discharges).
  - Compared with females ages 18-24, females ages 35-55 were also more likely to experience VTE/PE (0.4 vs. 0.2 per 1,000 delivery discharges).

Cesarean Delivery of Low-Risk First Births, by Race/Ethnicity

Cesarean delivery of low-risk first births, by race/ethnicity, 2018-2020

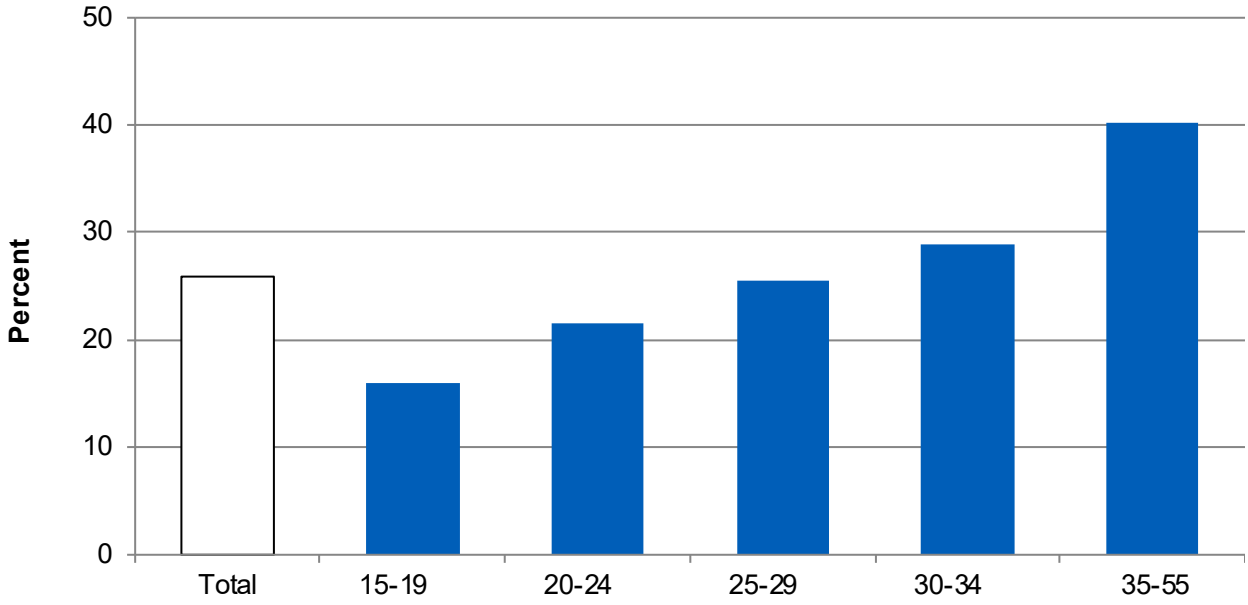


Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System – Natality, 2018-2020.
Note: For this measure, lower percentages are better. Black and White are non-Hispanic. Hispanic includes all races. Low-risk cesarean is defined as singleton, term (37 or more weeks of gestation), vertex (not breech) cesarean deliveries to women having a first birth. Gestational age is defined by obstetric estimate of gestation at delivery and thus may not be comparable with previously published rates. This measure is not included in the summary analysis.

- **Importance:** Cesarean deliveries are associated with heightened levels of adverse events and complications for future pregnancies. Limiting cesarean deliveries in low-risk births is seen as an important part of reducing cesarean deliveries overall.
- **Overall Percentage:** In 2020, cesarean deliveries made up 25.9% of low-risk first births.
- **Trends:** From 2018 to 2020, the percentage of females having cesarean deliveries for low-risk first births showed no statistically significant change for all ethnic groups.
- **Groups With Disparities:**
  - From 2018 to 2020, the percentage of cesarean deliveries for low-risk first births was higher for Black females compared with White females (30.1% vs. 24.9% in 2018; 30.6% vs. 24.9% in 2020). This disparity has not narrowed over time.
  - From 2018 to 2020, the percentage of cesarean deliveries for low-risk first births was similar for Hispanic females and White females (25.4% vs. 24.9% in 2018; 25.2% vs. 24.9% in 2020).

Cesarean Delivery of Low-Risk First Births, by Age

Cesarean delivery of low-risk first births, by age, 2020

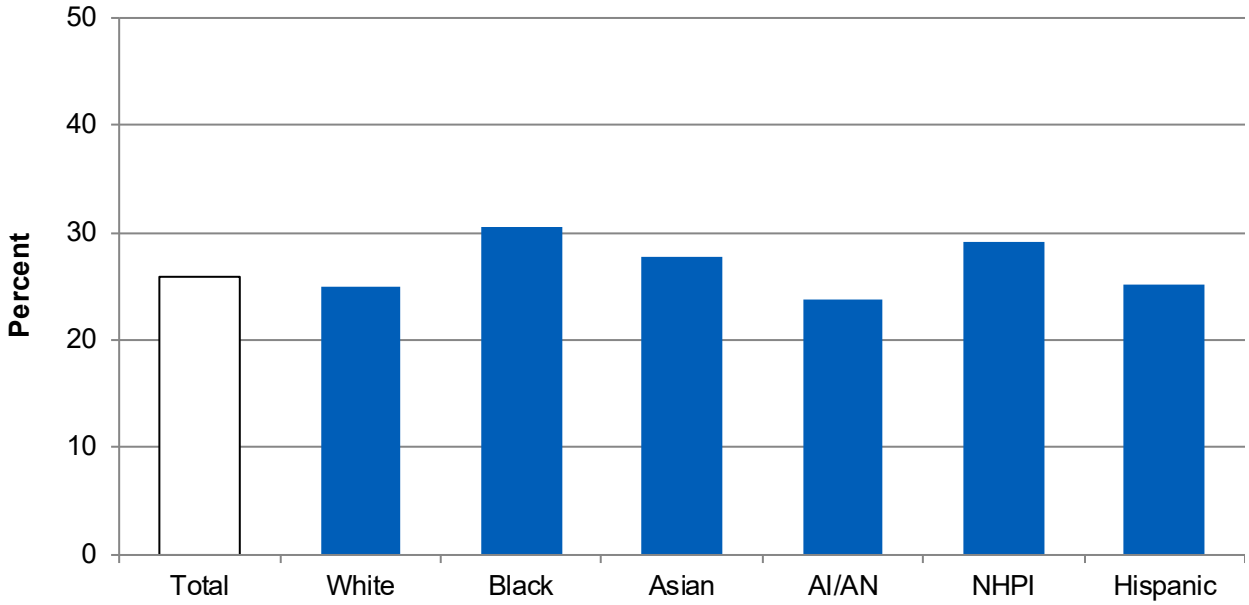


Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System – Natality, 2020.
Note: For this measure, lower percentages are better. Low-risk cesarean is defined as singleton, term (37 or more weeks of gestation), vertex (not breech) cesarean deliveries to women having a first birth. Gestational age is defined by obstetric estimate of gestation at delivery and thus may not be comparable with previously published rates. This measure is not included in the summary analysis.

- **Groups With Disparities:**
  - Females ages 15-19 giving birth for the first time had lower rates of cesarean delivery than females ages 20-24 (15.9% vs. 21.5%).
  - Females ages 25-29, 30-34, and 35-55 giving birth for the first time all had higher rates of cesarean delivery compared with females ages 20-24 (25.6%, 28.9%, and 40.3%, respectively, vs. 21.5%).

Cesarean Delivery of Low-Risk First Births, by Race/Ethnicity

Cesarean delivery of low-risk first births, by race/ethnicity, 2020



Key: AI/AN = American Indian or Alaska Native; NHPI = Native Hawaiian/Pacific Islander.
Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System – Natality, 2020.
Note: For this measure, lower percentages are better. Low-risk cesarean is defined as singleton, term (37 or more weeks of gestation), vertex (not breech) cesarean deliveries to women having a first birth. Gestational age is defined by obstetric estimate of gestation at delivery and thus may not be comparable with previously published rates. White, Black, Asian, AI/AN, and NHPI are non-Hispanic. Hispanic includes all races. This measure is not included in the summary analysis.

- **Groups With Disparities:**
  - AI/AN females giving birth for the first time had lower rates of cesarean delivery than White females (23.7% vs. 24.9%).
  - Black, Asian, NHPI, and Hispanic females giving birth for the first time all had higher rates of cesarean delivery compared with White females (30.6%, 27.7%, 29.2%, and 25.2%, respectively, vs. 24.9%).

Resources: Perinatal Safety Toolkit

- AHRQ developed the Safety Program for Perinatal Care (SPPC) to improve the patient safety culture of labor and delivery units and decrease maternal and neonatal adverse events resulting from poor communication and system failures.
- The SPPC is organized around three program pillars:
  - Teamwork and Communication Skills.
  - Perinatal Safety Strategies.
  - In Situ Simulation Training.
- The Toolkit for Improving Perinatal Safety is available online.

Adverse Drug Events

An estimated one-third of all adverse events that occur in the inpatient setting are adverse drug events (ODPHP, 2020a). The HHS National Action Plan for Adverse Drug Event Prevention targets three areas:

- Bleeding related to use of anticoagulants.
- Hypoglycemia related to use of diabetes medications.
- Accidental overdose, oversedation, and respiratory depression related to use of opioids.

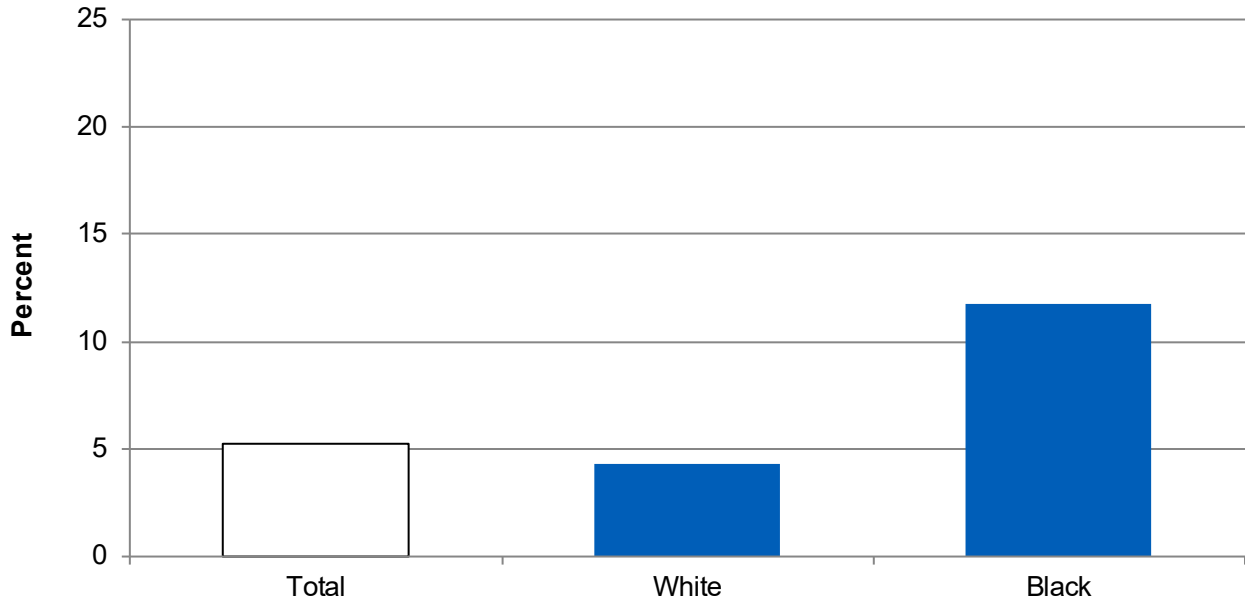
An adverse drug event (ADE) is an injury—including physical harm, mental harm, or loss of function—resulting from medical intervention involving a drug. More information is available in Patient Safety Primer: Medication Errors and Adverse Drug Events (https://psnet.ahrq.gov/primer/medication-errors-and-adverse-drug-events, and in the HHS National Action Plan for Adverse Drug Event Prevention (https://health.gov/hcq/ade-action-plan.asp).

Adverse Drug Event Measures

- Hospitalized adult patients who received a hypoglycemic agent and had an adverse drug event
- Hospitalized patients with an anticoagulant-related adverse drug event to low-molecular-weight heparin (LMWH) or factor Xa inhibitor

Hospital Patients With Adverse Drug Events With Hypoglycemic Agents, by Race/Ethnicity

Adult hospital patients who received a hypoglycemic agent who had adverse drug events with hypoglycemic agents, by race/ethnicity, 2020

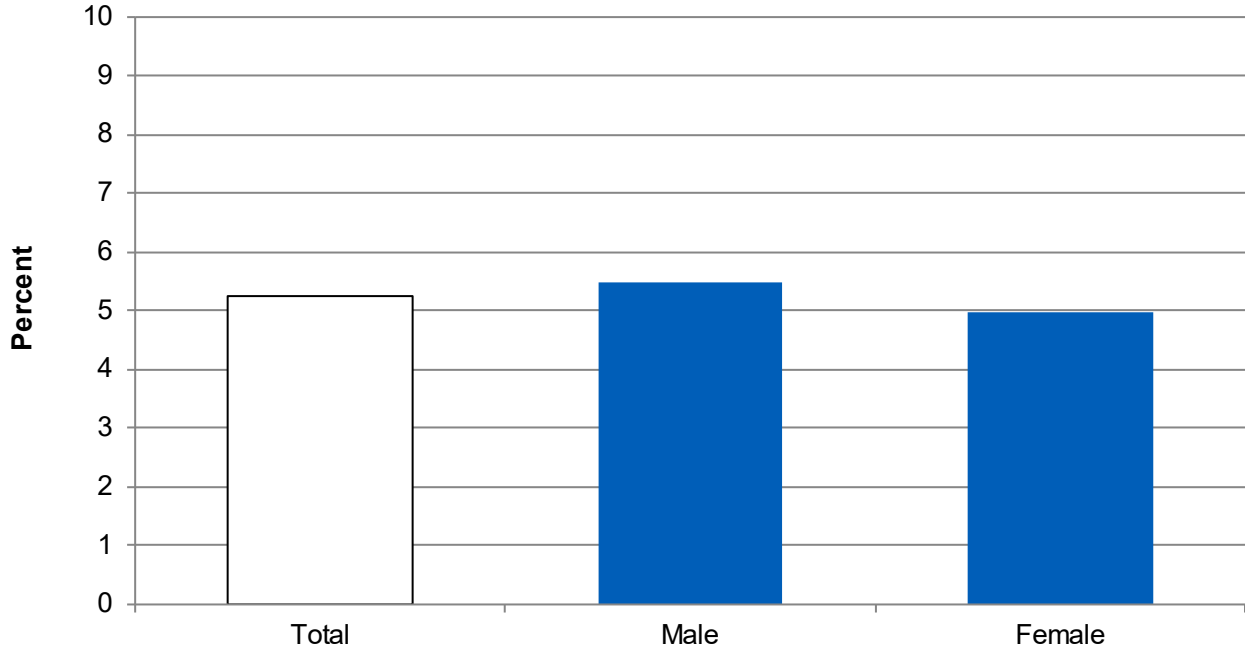


Source: Agency for Healthcare Research and Quality and Centers for Medicare & Medicaid Services, Quality and Safety Review System, 2020.
Note: For this measure, lower percentages are better. Hypoglycemic agents received by patients age 18 and over during a hospital stay include insulin, oral hypoglycemic agents, or both. White and Black are non-Hispanic. Data do not meet the criteria for statistical reliability, data quality, or confidentiality for all other racial and ethnic groups.

- **Importance:** Hypoglycemic agents ingested by mouth are typically used in patients with type 2 diabetes to control blood sugar levels. In some cases, diabetic patients use hypoglycemic agents together with insulin. The risk of chronic kidney disease increases for people with diabetes, and renal impairment can increase the risk of adverse events related to hypoglycemic agents.
- **Groups With Disparities:**
  - In 2020, the percentage of adult hospital patients with adverse drug events with hypoglycemic agents was higher for Black patients than for White patients (11.7% vs. 4.3%).

Hospital Patients With Adverse Drug Events With Hypoglycemic Agents, by Sex

Adult hospital patients who received a hypoglycemic agent who had adverse drug events with hypoglycemic agents, by sex, 2020

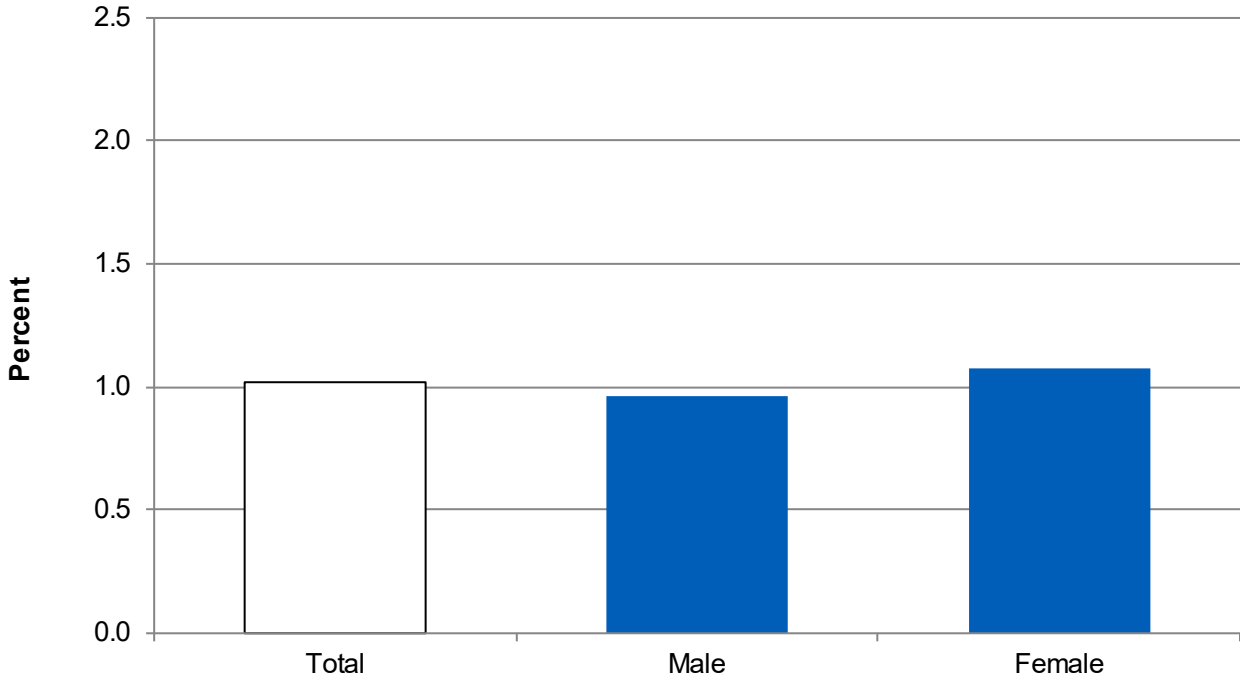


Source: Agency for Healthcare Research and Quality and Centers for Medicare & Medicaid Services, Quality and Safety Review System, 2020.
Note: For this measure, lower percentages are better. Hypoglycemic agents received by patients age 18 and over during a hospital stay include insulin, oral hypoglycemic agents, or both. Data for this measure are only available from September to December 2020.

- **Groups With Disparities:**
  - In 2020, there were no statistically significant disparities by sex in the percentage of patients with adverse drug events with hypoglycemic agents.

Hospital Patients With Adverse Events With Heparin or Factor Xa Inhibitor, by Sex

Hospital patients with an anticoagulant-related adverse drug event with low-molecular-weight heparin (LMWH) or factor Xa inhibitor, by sex, 2020



Source: Agency for Healthcare Research and Quality and Centers for Medicare & Medicaid Services, Quality and Safety Review System (QSRS), 2020.
Denominator: All patients from the QSRS sample who received LMWH or factor Xa inhibitor during the index hospital stay.
Numerator: A subset of the denominator who experienced:

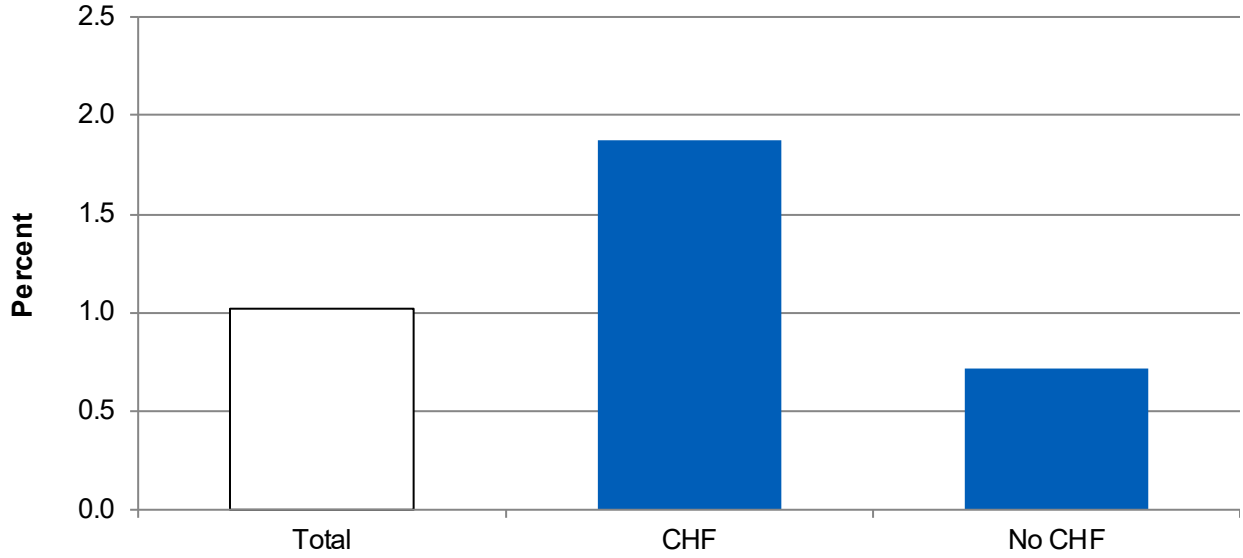
- Abrupt cessation/hold of LMWH or factor Xa with one of the following: cardiac arrest/emergency measures to sustain life, death, gastrointestinal bleeding, genitourinary bleeding, hematocrit drop of 3 or more points more than 48 hours after admission, intracranial bleeding (subdural hematoma), new hematoma, pulmonary bleeding, or other types of bleeding.
- Administration of protamine or fresh frozen plasma with one or more of the above symptoms.
- Blood transfusion (absent a surgical procedure) with one or more of the above symptoms.

Note: For this measure, lower percentages are better.

- **Importance:** Low-molecular-weight heparin (LMWH) and factor Xa inhibitors are widely used to prevent and treat venous thromboembolism and acute coronary syndromes. Although these drugs have been shown to improve outcomes, adverse events associated with bleeding remain a concern, and uncertainties remain about safety for specific patient populations, including pregnant women (Lim, 2010; Sobieraj, et al., 2012); and drug dosing in patients with chronic kidney disease may require adjustments (Lobo, 2007).
- **Groups With Disparities:**
  - In 2020, there were no statistically significant disparities by sex in the percentage of patients with adverse drug events with LMWH or factor Xa inhibitors.

Hospital Patients With Adverse Events With Heparin or Factor Xa Inhibitor, by CHF Status

Hospital patients with an anticoagulant-related adverse drug event with low-molecular-weight heparin (LMWH) or factor Xa Inhibitor, by congestive heart failure status, 2020



Source: Agency for Healthcare Research and Quality and Centers for Medicare & Medicaid Services, Quality and Safety Review System (QSRS), 2020.
Denominator: All patients from the QSRS 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 3 or more points more than 48 hours after admission, intracranial bleeding (subdural hematoma), new hematoma, pulmonary bleeding, or other types of bleeding.
- Administration of protamine or fresh frozen plasma with one or more of the above symptoms.
- Blood transfusion (absent a surgical procedure) with one or more of the above symptoms.

Note: The chronic condition of focus departs from previous NHQDR chartbooks due to MPSMS data no longer being in use. For this measure, lower percentages are better.

- **Groups With Disparities:**
  - In 2020, patients with CHF were more likely to experience anticoagulant-related adverse events than those without (1.9% vs. 0.72%)

Adverse Drug Event Prevention Resources

AHRQ offers several resources to improve the quality and safety of hospital care when using blood thinner medicines. These include:

- Patient Guide to Using Blood Thinners: Blood Thinner Pills: Your Guide to Using Them Safely
- MATCH Toolkit (medication reconciliation)

Visit AHRQ.gov for more tools and resources for hospital care.

Patient Safety in the Ambulatory Setting

Although patient safety initiatives frequently focus on inpatient hospital events, adverse effects of medical care may be identified and treated in outpatient settings. Ambulatory care is delivered in outpatient settings, or settings where patients are not admitted for care. Examples of ambulatory care settings include medical offices and clinics, ambulatory surgery centers, hospital outpatient departments, and dialysis centers.

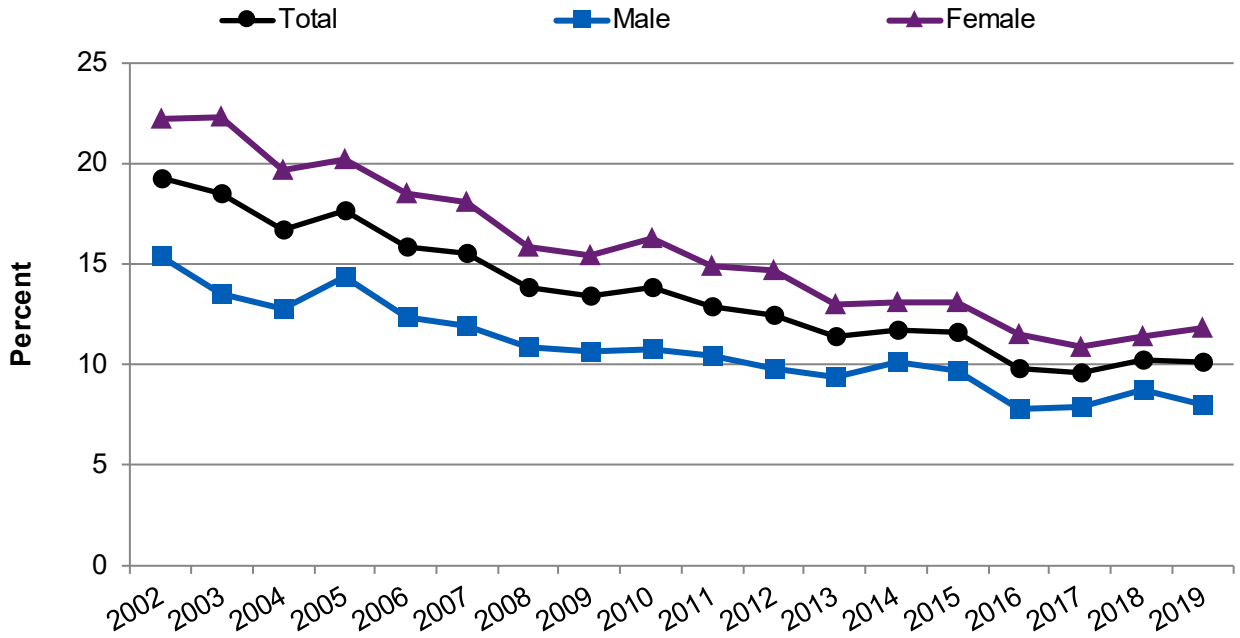
Adverse effects of medical care can follow ambulatory care or procedures provided in hospitals, emergency departments, physician offices, or other settings. More information is available in Patient Safety Primer: Ambulatory Care Safety (https://psnet.ahrq.gov/primer/ambulatory-care-safety).

In this section, measures address:

- Adults age 65 and over who received during the calendar year at least 1 of 33 potentially inappropriate prescription medications.

Older Adults Who Received Inappropriate Medications, by Sex

Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults, by sex, 2002-2019



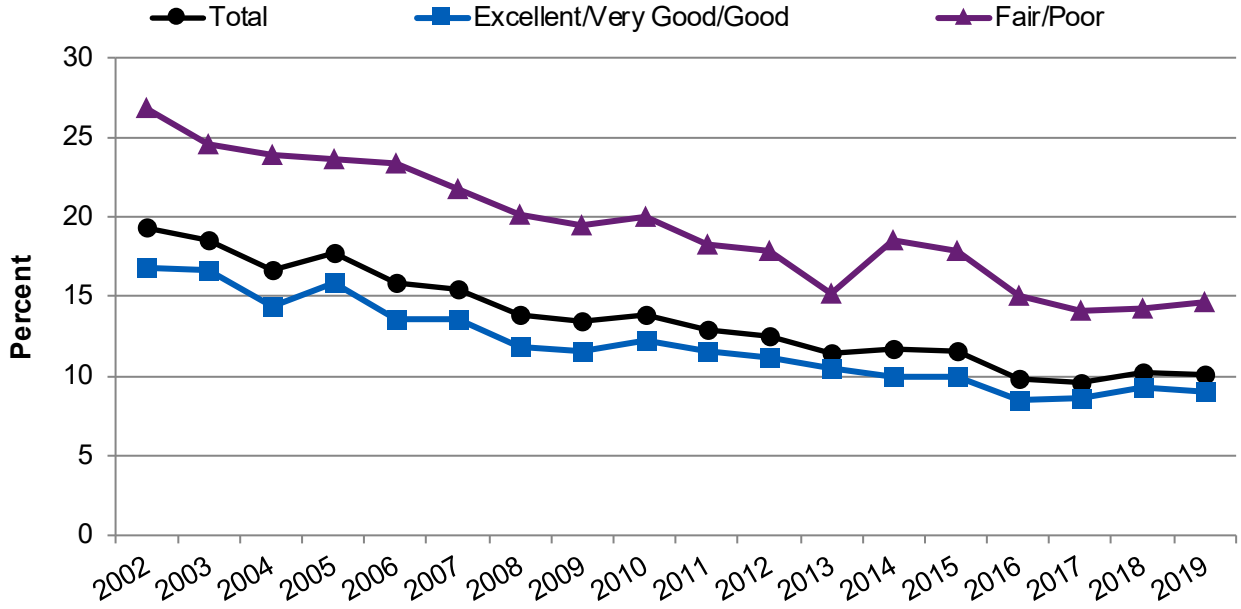
Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2002-2019.
Note: For this measure, lower percentages are better. Prescription medications received include all prescribed medications initially purchased or otherwise obtained as well as any refills. For more information on inappropriate medications, refer to the American Geriatrics Society 2012 Beers Criteria Update Expert Panel: American Geriatrics Society updated Beers Criteria for potentially inappropriate medication use in older adults. J Am Geriatr Soc 2012 Apr;60(4):616-31. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3571677/.

- **Importance:** Some drugs that are prescribed for older patients are known to be potentially harmful for this age group.

- **Overall Percentage:** In 2019, 10.1% of adults age 65 years and over received potentially inappropriate prescription medications.
- **Trends:** From 2002 to 2019, the percentage of adults age 65 years and over who received potentially inappropriate prescription medications fell (improved) overall and for both sexes.
- **Groups With Disparities:** In 2019, the percentage of female adults age 65 years and over receiving at least 1 of 33 prescription medications potentially inappropriate for older adults was higher (worse) than the percentage of male adults age 65 years and over (11.8% vs. 8.0%).
- **Changes in Disparities:** In 2002, the percentage of patients receiving potentially inappropriate medications was higher among females than males. This gap has not narrowed significantly over time.

Older Adults Who Received Inappropriate Medications, by Perceived Health Status

Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults, by perceived health status, 2002-2019



Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2002-2019.
Note: For this measure, lower percentages are better. Prescription medications received include all prescribed medications initially purchased or otherwise obtained as well as any refills. For more information on inappropriate medications, refer to the American Geriatrics Society 2012 Beers Criteria Update Expert Panel: American Geriatrics Society updated Beers Criteria for potentially inappropriate medication use in older adults. J Am Geriatr Soc 2012 Apr;60(4):616-31. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3571677/.

- **Trends:** From 2002 to 2019, the percentage of adults age 65 years and over who received potentially inappropriate prescription medications fell (improved) overall and for both perceived health status groups.
- **Groups With Disparities:** In 2019, the percentage of patients receiving potentially inappropriate medications was higher (worse) among people with Fair/Poor health status compared with people with Excellent/Very Good/Good health status (14.6% vs. 9.0%).

AHRQ Supported Resource To Improve Patient Safety in Ambulatory Settings

- **Tool:** Toolkit To Engage High-Risk Patients in Safe Transitions Across Ambulatory Settings
- **Purpose:** To actively engage patients and their care partners to prevent errors during transitions of care
- **Intended Users:** Primary care office managers and providers
- **Available Tools:**
  - Implementation guide
  - Preintervention assessment of current practices to identify gaps
  - Patient appointment aid to encourage patients to ask questions and communicate needs and preferences
  - Checklist for clinicians to help them prepare patients for new healthcare appointments
  - Educational training video for clinicians
- **Link:** https://www.ahrq.gov/hai/tools/ambulatory-care/safe-transitions.html

Patient safety measures that could be directly affected by implementation of this toolkit by ambulatory care providers include:

- 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.
- Adults age 65 and over who received in the calendar year at least 1 of 33 potentially inappropriate prescription medications for older adults.
- Short-stay home health patients who had drug education on all medications.

Patient safety measures that could be indirectly affected by implementation of this toolkit by ambulatory care providers who share information with home health care providers include:

- Adults who reported a home health care provider talking with them about all the prescription and over-the-counter medicines they were taking when they first started getting home health care.
- Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care.
- Adults who reported that home health care providers talked with them about the purpose of taking their new or changed prescription medicines in the last 2 months of care.

Ambulatory Safety Resources

AHRQ offers several other resources to improve the quality and safety of ambulatory care, including:

- Medical Office Survey on Patient Safety Culture,
- TeamSTEPPS for Office-Based Care, and
- Toolkit To Improve Antibiotic Use in Ambulatory Care.

Visit AHRQ.gov for more tools and resources for ambulatory care.

Patient Safety in the Nursing Home Setting

Nursing homes, or skilled nursing facilities, provide a wide range of health and personal care services. Nursing home residents may stay for a short period of time, where they may receive rehabilitation after inpatient care, or in a long-term care facility where residents receive extended health and personal care. For nursing home residents, optimal care seeks to maximize quality of life and minimize unintended complications.

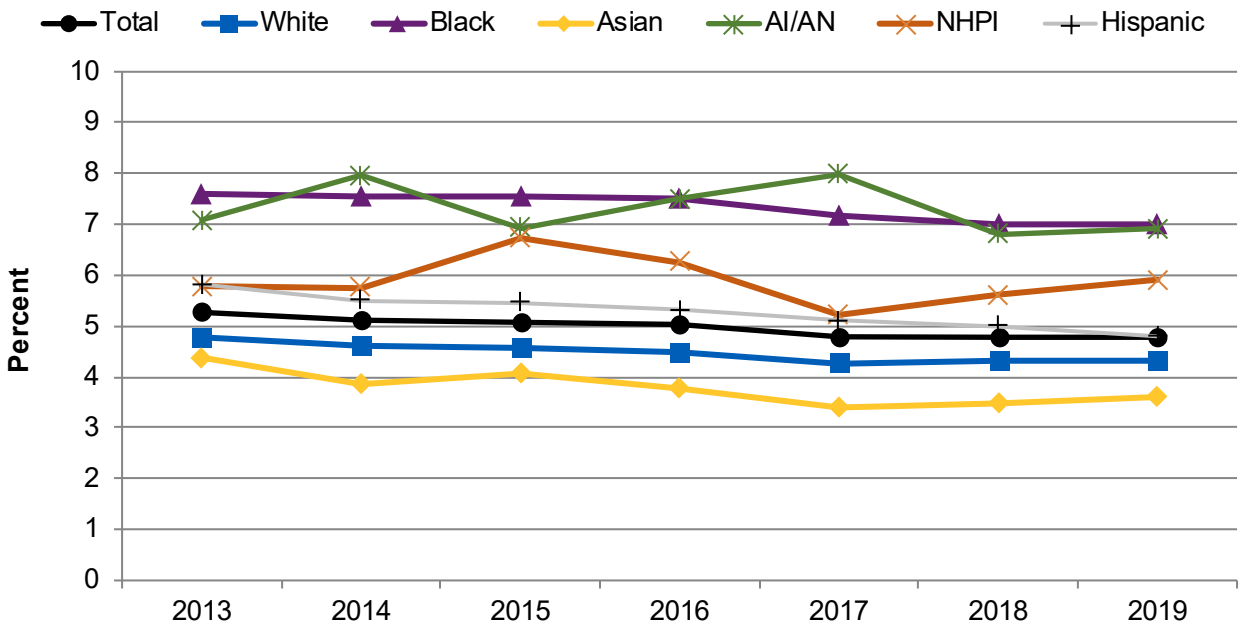
Estimates show that the United States has more than 15,000 nursing homes (Harris-Kojetin, et al., 2019). More than 1 million people receive care in U.S. nursing homes annually (KFF, 2019).

In this section, measures address:

- High-risk, long-stay nursing home residents with pressure ulcers.
- Long-stay nursing home residents with a urinary tract infection.
- Long-stay nursing home residents experiencing one or more falls with major injury.
- Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder.

Nursing Home Residents With Pressure Ulcers, by Race/Ethnicity

High-risk, long-stay nursing home residents with pressure ulcers, by race/ethnicity, 2013-2019

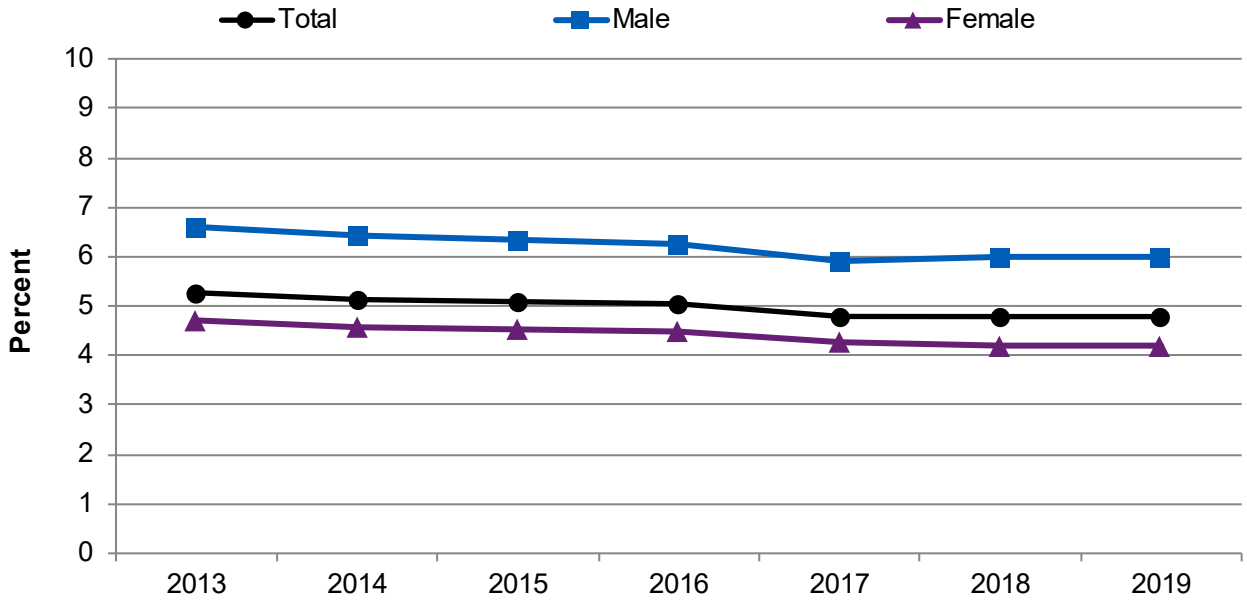


Key: AI/AN = American Indian or Alaska Native; NHPI = Native Hawaiian/Pacific Islander.
Source: Centers for Medicare & Medicaid Services, Skilled Nursing Facility Quality Reporting Program, Chronic Conditions Data Warehouse, Resident Assessment Files, Minimum Data Set 3.0, 2013-2019.
Denominator: Medicare chronic care nursing home long-stay residents with a valid target assessment and with any of the following conditions on the target assessment: impaired in bed mobility or transfer, comatose, or suffering from malnutrition.
Numerator: Subset of the denominator with stages 2-4 pressure ulcer on target assessment.
Note: White, Black, Asian, AI/AN, and NHPI are non-Hispanic. Hispanic includes all races.

- **Importance:** Pressure ulcers are an important clinical problem for nursing home residents and a major quality issue for the facilities. In addition, many people sue over wounds, which is costly for nursing homes and poses a significant legal risk. More importantly, pressure ulcers lower quality of life and increase morbidity and mortality rates (Au, et al., 2019), which can affect some populations more than others. One study found higher rates of pressure ulcers in Black male residents (Seibert, et al., 2020).
- **Overall Percentage:** In 2019, 4.8% of long-stay nursing home residents who were impaired in bed mobility or transfer, comatose, or suffering from malnutrition at the time of an assessment were experiencing a pressure ulcer.
- **Trends:** From 2013 to 2019, the percentage of nursing home residents who experienced a pressure ulcer declined (improved) overall and for all racial/ethnic groups except AI/AN and NHPI.
- **Groups With Disparities:**
  - In 2019, Black residents were more likely than White residents to have a pressure ulcer (7.0% vs. 4.3%).
  - In 2019, Asian residents were less likely than White residents to have a pressure ulcer (3.6% vs. 4.3%).
  - In 2019, AI/AN residents were more likely than White residents to have a pressure ulcer (6.9% vs. 4.3%).
  - In 2019, NHPI residents were more likely than White residents to have a pressure ulcer (5.9% vs. 4.3%).
  - In 2019, Hispanic residents were more likely than White residents to have a pressure ulcer (4.8% vs. 4.3%).
- **Trends in Disparities:**
  - In 2013, the percentage of residents with a pressure ulcer was higher for Black, AI/AN, NHPI, and Hispanic residents than for White residents, and the disparities did not narrow (improve) over time.

Nursing Home Residents With Pressure Ulcers, by Sex

High-risk, long-stay nursing home residents with pressure ulcers, by sex, 2013-2019

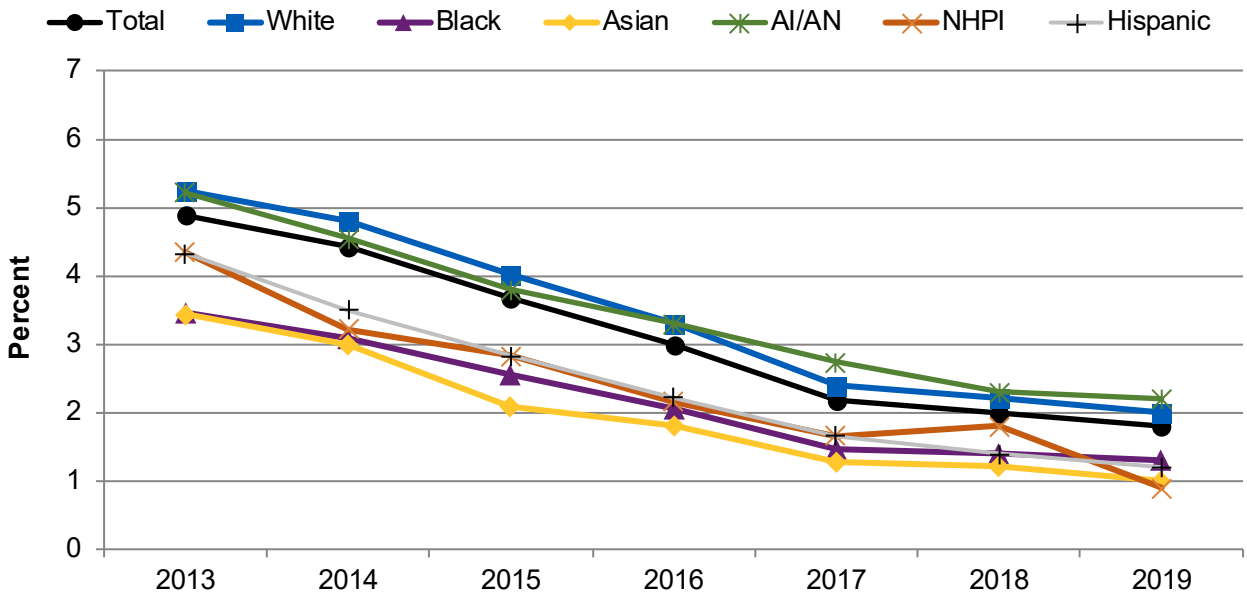


Source: Centers for Medicare & Medicaid Services, Skilled Nursing Facility Quality Reporting Program, Chronic Conditions Data Warehouse, Resident Assessment Files, Minimum Data Set 3.0, 2013-2019.
Denominator: Medicare chronic care nursing home long-stay residents with a valid target assessment and with any of the following conditions on the target assessment: impaired in bed mobility or transfer, comatose, or suffering from malnutrition.
Numerator: Subset of the denominator with stages 2-4 pressure ulcer on target assessment.

- **Trends:** From 2013 to 2019, the percentage of nursing home residents who experienced a pressure ulcer declined (improved) overall and for both sexes.
- **Groups With Disparities:**
  - In 2019, female nursing home residents were less likely than male residents to have a pressure ulcer (4.2% vs. 6.0%).

Nursing Home Residents With a Urinary Tract Infection, by Race/Ethnicity

Long-stay nursing home residents with a urinary tract infection, by race/ethnicity, 2013-2019

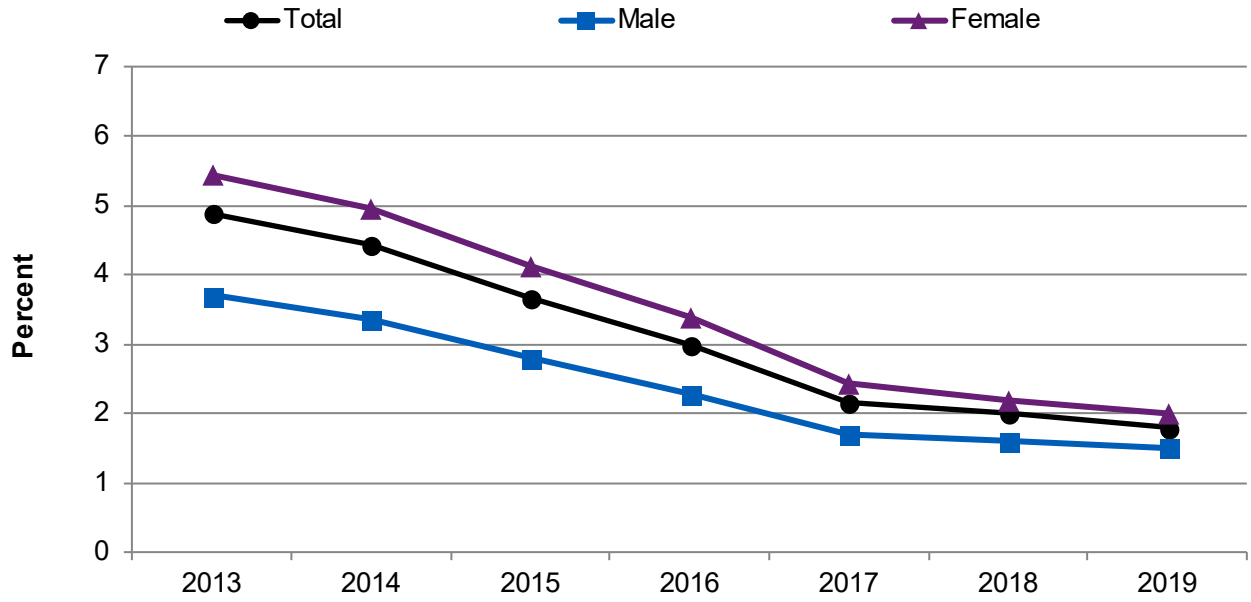


Key: AI/AN = American Indian or Alaska Native; NHPI = Native Hawaiian/Pacific Islander.
Source: Centers for Medicare & Medicaid Services, Skilled Nursing Facility Quality Reporting Program, Resident Assessment Files, Minimum Data Set 3.0, 2013-2019.
Denominator: Medicare chronic care nursing home long-stay residents with a valid target assessment, excluding admission assessments and target assessments with missing values.
Numerator: Subset of the denominator where a urinary tract infection was reported on the target assessment within the last 30 days.
Note: White, Black, Asian, AI/AN, and NHPI are non-Hispanic. Hispanic includes all races.

- **Importance:** A urinary tract infection (UTI) and particularly a catheter-associated urinary tract infection (CAUTI) is an example of a preventable infection that occurs in many long-term care facilities. Several national, state, and local programs, including AHRQ's Safety Program for Long-Term Care: HAIs/CAUTI, have worked to bring quality and safety tools to nursing homes in an effort to reduce these infections. While infection rates for most populations have declined, racial, ethnic, and sex disparities still persist.
- **Overall Percentage:** In 2019, 1.8% of long-stay nursing home residents had a UTI within the 30 days prior to assessment.
- **Trends:** From 2013 to 2019, the percentage of long-stay nursing home residents with a UTI declined (improved) overall and for all racial/ethnic groups.
- **Groups With Disparities:**
  - In 2019, Black residents were less likely than White residents to have a UTI (1.3% vs. 2.0%).
  - In 2019, Asian residents were less likely than White residents to have a UTI (1.0% vs. 2.0%).
  - In 2019, NHPI residents were less likely than White residents to have a UTI (0.9% vs. 2.0%).
  - In 2019, Hispanic residents were less likely than White residents to have a UTI (1.2% vs. 2.0%).
  - In 2019, White residents were less likely than AI/AN residents to have a UTI (2.0% vs. 2.2%).

Nursing Home Residents With a Urinary Tract Infection, by Sex

Long-stay nursing home residents with a urinary tract infection, by sex, 2013-2019

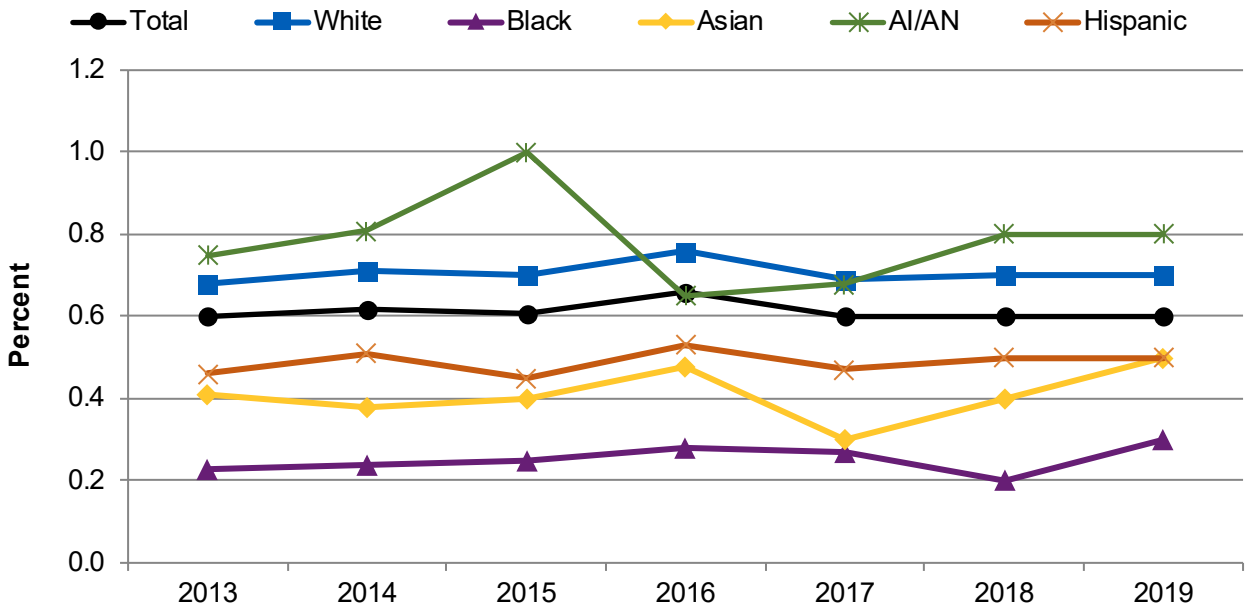


Source: Centers for Medicare & Medicaid Services, Skilled Nursing Facility Quality Reporting Program, Resident Assessment Files, Minimum Data Set 3.0, 2013-2019.
Denominator: Medicare chronic care nursing home long-stay residents with a valid target assessment, excluding admission assessments and target assessments with missing values.
Numerator: Subset of the denominator where a urinary tract infection was reported on the target assessment within the last 30 days.

- **Trends:** From 2013 to 2019, the number of long-stay nursing home residents with a UTI declined (improved) overall and for both sexes.
- **Groups With Disparities:**
  - In 2019, female nursing home residents were more likely than male residents to have a UTI (2.0% vs. 1.5%).
  - Female residents were also more likely than male residents to have a UTI in 2013, and the disparity did not improve over time.

Falls Among Nursing Home Residents, by Race/Ethnicity

Long-stay nursing home residents experiencing one or more falls with major injury, by race/ethnicity, 2013-2019



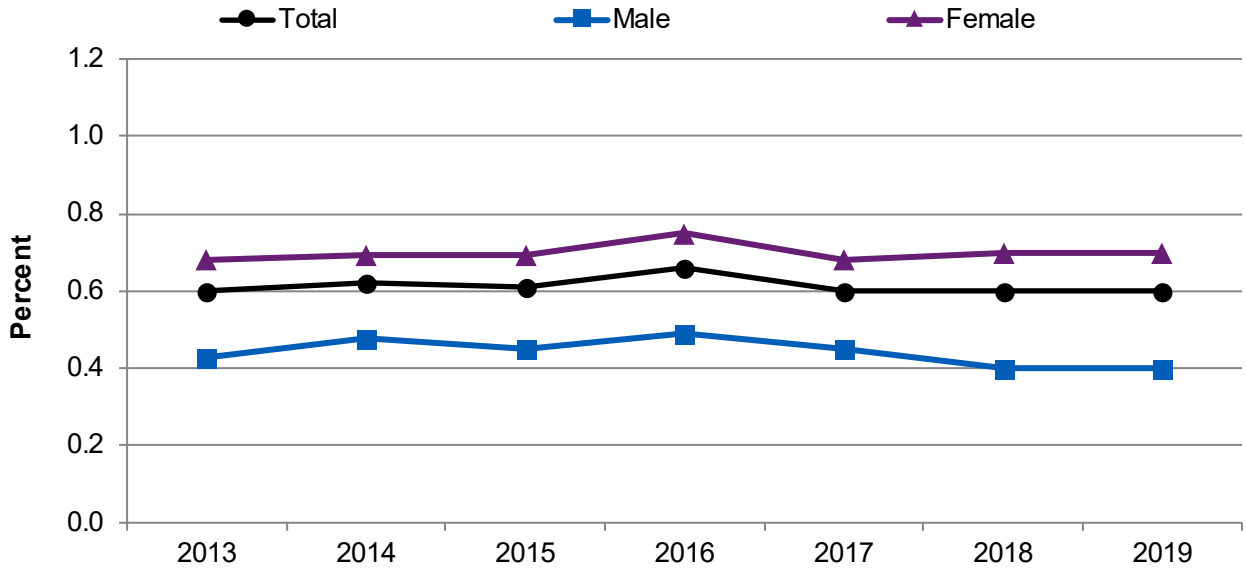
Key: AI/AN = American Indian or Alaska Native.
Source: Centers for Medicare & Medicaid Services, Skilled Nursing Facility Quality Reporting Program, Resident Assessment Files, Minimum Data Set 3.0, 2013-2019.
Denominator: Medicare chronic care nursing home long-stay residents with a valid target assessment; excludes residents who were not assessed for a fall or where the number of falls was not assessed.
Note: White, Black, Asian, and AI/AN are non-Hispanic. Hispanic includes all races. Data for Native Hawaiian/Pacific Islanders do not meet the criteria for statistical reliability, data quality, or confidentiality and are not included.

- **Importance:** In 2012, it was estimated that almost 530,000 nursing home residents in U.S. nursing facilities fell every year. Moreover, one-third experienced more than two falls annually (AHRQ, 2017). Research by Sanghavi, et. al. (2020) showed that reporting for falls in White adults was higher than non-White adults when not controlling for facility-level and racial characteristics.
- **Overall Percentage:** In 2019, 0.6% of long-stay nursing home residents with a valid target assessment experienced one or more falls with major injury.
- **Trends:** From 2013 to 2019, there was no change in the overall percentage of long-stay nursing home residents with a valid target assessment who experienced one or more falls with major injury. However, the percentage of residents who experienced one or more falls with major injury increased slightly (worsened) for White, Black, Asian, AI/AN, and Hispanic groups.
- **Groups With Disparities:**
  - In 2019, Black residents were less likely than White residents to have experienced a fall with major injury (0.3% vs. 0.7%).
  - In 2019, Asian residents were less likely than White residents to have experienced a fall with major injury (0.5% vs. 0.7%).

- In 2019, Hispanic residents were less likely than White residents to have experienced a fall with major injury (0.5% vs. 0.7%).
- In 2019, White residents were less likely than AI/AN residents to have experienced a fall with major injury (0.7% vs. 0.8%).

Falls Among Nursing Home Residents, by Sex

Long-stay nursing home residents experiencing one or more falls with major injury, by sex, 2013-2019

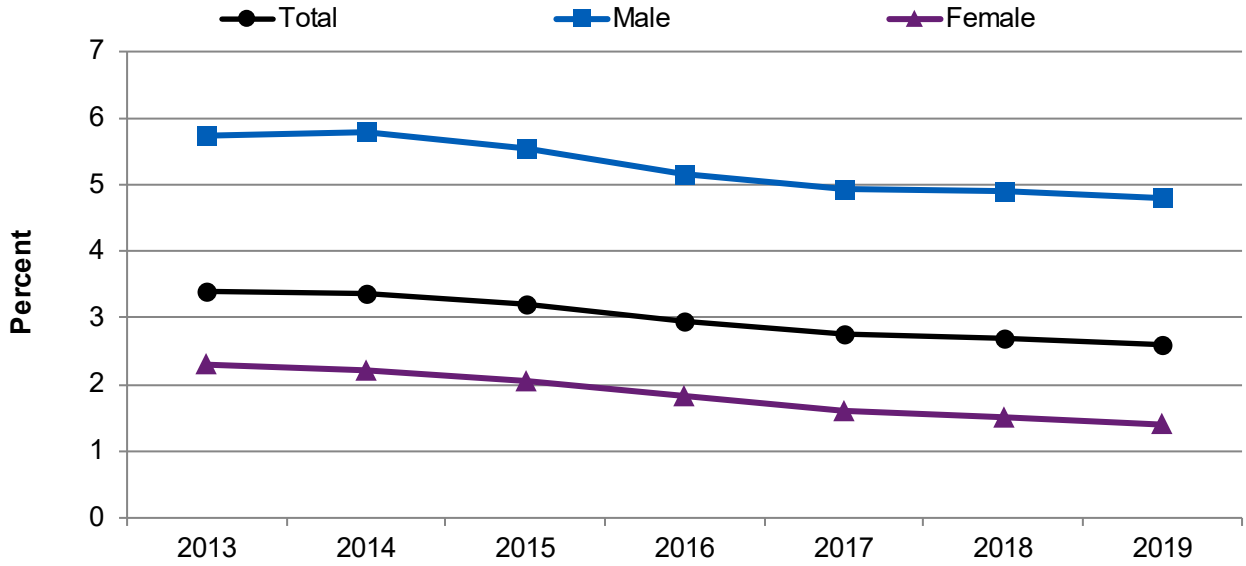


Source: Centers for Medicare & Medicaid Services, Skilled Nursing Facility Quality Reporting Program, Resident Assessment Files, Minimum Data Set 3.0, 2013-2019.
Denominator: Medicare chronic care nursing home long-stay residents with a valid target assessment; excludes residents who were not assessed for a fall or where the number of falls was not assessed.

- **Trends:** From 2013 to 2019, there was no change in the percentage of long-stay nursing home residents with a valid target assessment who experienced one or more falls with major injury overall and for both sexes.
- **Groups With Disparities:**
  - In 2019, female nursing home residents were more likely than male residents to have experienced a fall with major injury (0.7% vs. 0.4%).
  - Female residents were also more likely than male residents to have experienced a fall with major injury in 2013, and the disparity did not improve over time.

Nursing Home Residents With a Catheter Inserted and Left in the Bladder

Low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder, by sex, 2013-2019



Source: Centers for Medicare & Medicaid Services, Skilled Nursing Facility Quality Reporting Program, Chronic Conditions Data Warehouse, Resident Assessment Files, Minimum Data Set 3.0, 2013-2019.
Denominator: Medicare chronic care nursing home long-stay residents with a valid target assessment, excluding admission assessments or assessments with missing data.
Numerator: Subset of the denominator with indwelling catheters on target assessment.

- **Importance:** Long-term catheter use can lead to UTIs. This safety issue provides the rationale for the quality indicator "catheter left in bladder" publicly reported by nursing homes via the CMS website (Simmons, et al., 2016). Infection prevention strategies include:
  - Minimizing catheter use in general and avoiding catheter use for incontinent residents;
  - Training staff in proper techniques for urinary catheter insertion;
  - Using a closed urinary drainage system;
  - Using external catheters instead of indwelling catheters when possible;
  - Documenting key information related to urinary catheter use; and
  - Providing stop orders or reminders to remove such catheters.
- **Overall Percentage:** In 2019, 2.6% of low-risk, long-stay nursing home residents had a catheter inserted and left in the bladder at the time of assessment.
- **Trends:** Between 2013 and 2019, the percentage of low-risk, long-stay nursing home residents with a catheter inserted and left in the bladder declined (improved) from 3.4% to 2.6%. The percentage also declined for both sexes.
- **Groups With Disparities:**
  - In 2019, female residents were less likely than male residents to have had a catheter inserted and left in the bladder (1.4% vs. 4.8%).

Nursing Home Safety Resources

AHRQ offers several resources to improve the quality and safety of care in nursing homes. These include:

- On-Time Pressure Ulcer Prevention,
- CUSP Toolkit To Reduce CAUTI and Other HAIs In Long-Term Care Facilities, and
- Falls Management Program.

AHRQ is also funding the AHRQ ECHO National Nursing Home COVID-19 Action Network. This network is working with nursing homes nationally to implement quality and safety interventions to reduce the spread of COVID-19. Visit AHRQ.gov for more tools and resources for long-term and nursing home care.

Patient Safety in the Home Health Setting

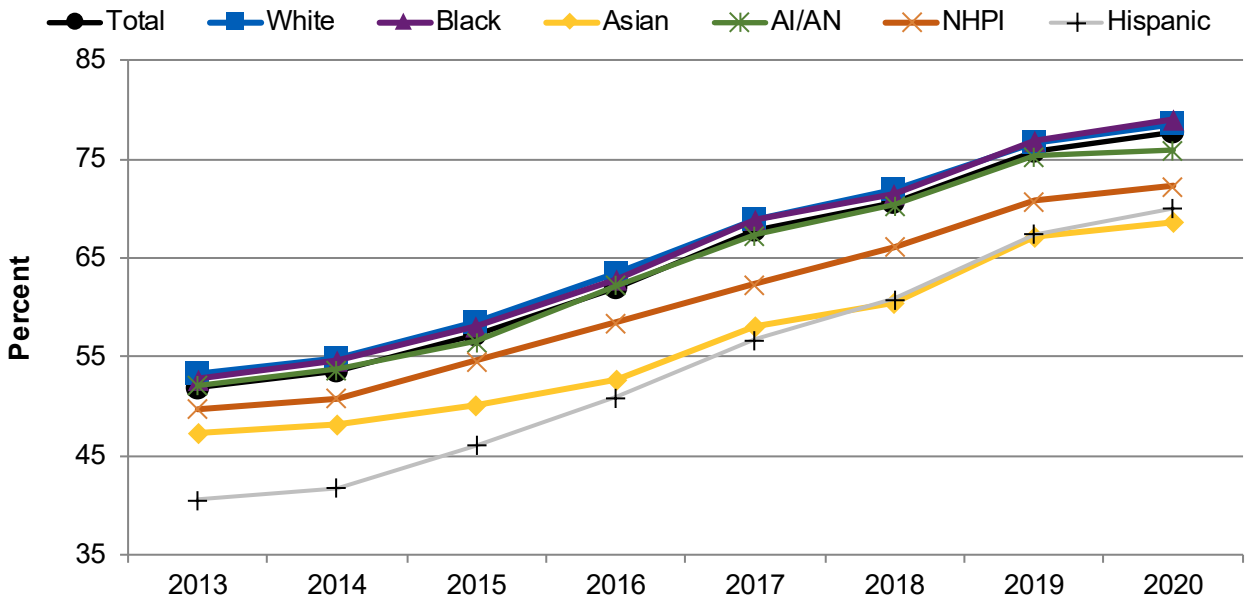
Home health agencies provide services to patients who are homebound and need skilled nursing care or therapy. In 2020, about 3.1 million Medicare beneficiaries had a home health episode, and approximately 1.5 million individuals were employed in home health care (AAHQI, 2021). Reasons for seeking home health care include acute illness, long-term health conditions, permanent disability, and terminal illness (NAHCH, 2010). Improvements among home health patients can reflect the quality of care from home health agencies.

In this section, measures address:

- Home health care patients whose management of oral medications improved, by race/ethnicity.
- Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care, by race/ethnicity and age.

Home Health Care Patients With Improved Management of Oral Medications

Home health care patients whose management of oral medications improved, by race/ethnicity, 2013-2020



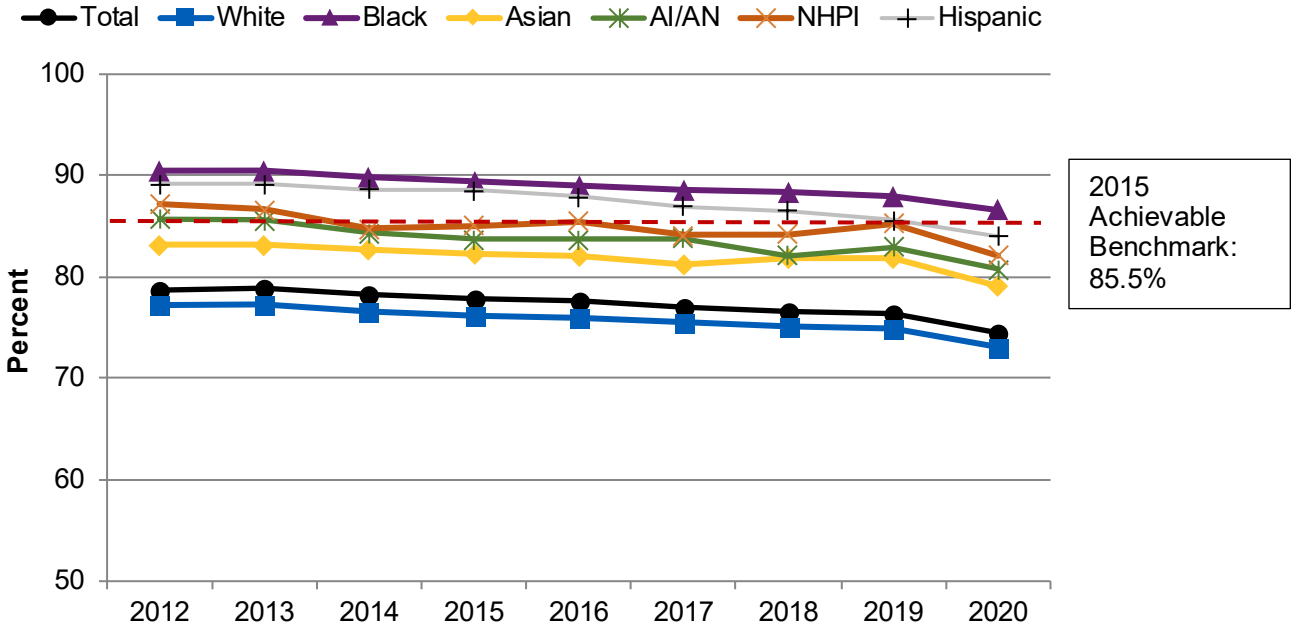
Key: AI/AN = American Indian or Alaska Native; NHPI = Native Hawaiian/Pacific Islander.
Source: Centers for Medicare & Medicaid Services, Outcome and Assessment Information Set, 2013-2020.
Denominator: All valid home health care episodes that begin in the survey year, excluding episodes for patients not taking oral medications, patients initially able to take oral medications correctly without assistance or supervision, nonresponsive patients, and patients with missing medication management data.
Note: White, Black, Asian, AI/AN, and NHPI are non-Hispanic. Hispanic includes all races. Measure includes a subset of the denominator in which a person showed improvement in ability to manage oral medications compared with a prior assessment during an episode of care. Management is measured on a 4-level scale from 0 (fully independent) to 3 (entirely dependent) and refers to ability, not medication compliance. Further information about Home Health Quality Initiative measures is available at https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/homehealthqualityinits/home-health-quality-measures.

- **Importance:** Poor medication management may lead to incorrect, missed, and mistimed doses, reducing the effectiveness of medical treatment plans, making adverse events more likely, and potentially leading to hospitalization, injury, or death.
- **Overall Percentage:** In 2020, 77.7% of home health patients taking oral medications had improved their medication management during an episode of care.
- **Trends:** From 2013 to 2020, medication management improved for patients overall and for all racial/ethnic groups.
- **Groups With Disparities:**
  - In 2020, the percentage of home health care patients whose management of their oral medications improved was lower for Hispanic patients than for White patients (70.0% vs. 78.5%). Hispanic patients also fared worse than White patients in 2013, and the disparity did not improve significantly over time.

- In 2020, the percentage of home health care patients whose management of their oral medications improved was lower for Asian patients than for White patients (68.6% vs. 78.5%). Asian patients also fared worse than White patients in 2013, and the disparity grew (worsened) over time from 2013 to 2020.
- In 2020, the percentage of home health care patients whose management of their oral medications improved was lower for NHPI patients than for White patients (72.3% vs. 78.5%).
- In 2020, the percentage of home health care patients whose management of their oral medications improved was lower for AI/AN patients than for White patients (75.9% vs. 78.5%).
- In 2020, the percentage of home health care patients whose management of their oral medications improved was similar for Black patients and White patients (79.0 vs. 78.5%).

Home Health Care Providers Asking To See All Medications, by Race/Ethnicity

Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care, by race/ethnicity, 2012-2020

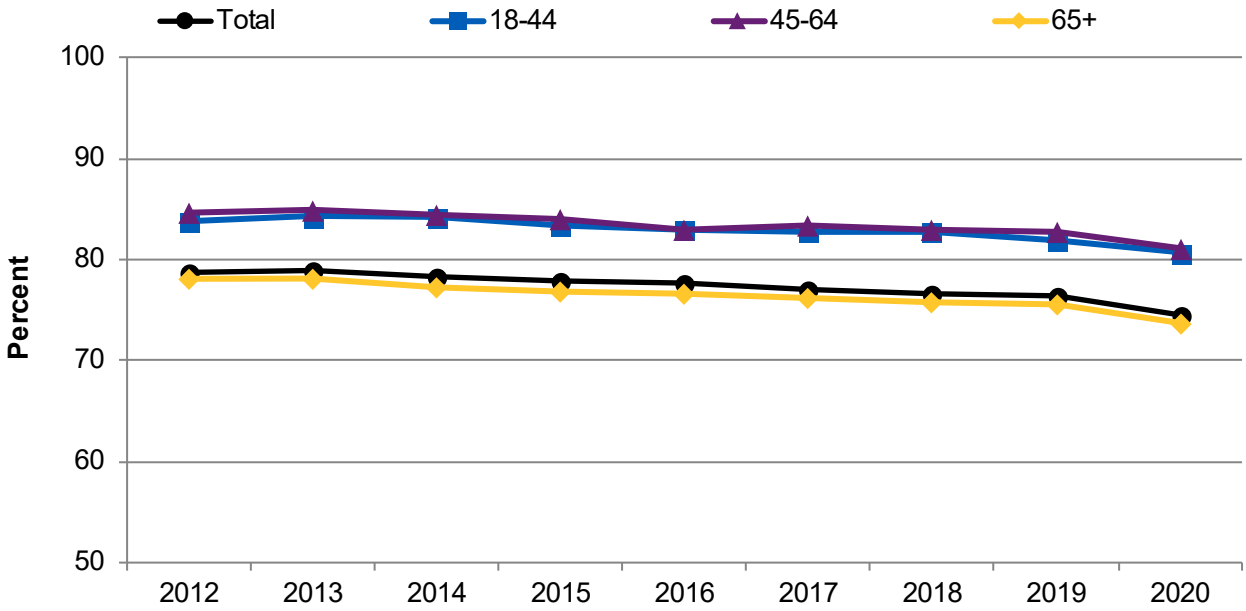


Key: AI/AN = American Indian or Alaska Native; NHPI: Native Hawaiian/Pacific Islander.
Source: Centers for Medicare & Medicaid Services, Consumer Assessment of Healthcare Providers and Systems Home Health Care Survey, 2012-2020.
Denominator: Adult home health care patients age 18 and over who provided 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 who "do not remember."

- **Importance:**
  - Home health care providers asking to see all medications is a preliminary step in ensuring that patients take only medications appropriate to their condition and understand why, when, and how much of each medication to take. This step may be especially important in protecting against medication errors and adverse events after transitions from facility-based care to home care.
  - This measure focuses on patients' recollection of their experience with the home health agency. It is important to note that the skill sets and required training of home health care workers vary substantially across states. While home health care workers in some states may be trained to assist providers in medication reconciliation, workers in other states may not. Medication reconciliation is a key part of ambulatory care. For more information, refer to Patient Safety Primer: Ambulatory Care Safety at https://psnet.ahrq.gov/primers/primer/16.
- **Overall Percentage:** In 2020, 74.5% of adult home health patients reported that they had been asked to show a home health care provider all the prescription and over-the-counter medicines they were taking when they first started getting home health care.
- **Trends:**
  - From 2012 to 2020, the percentage of home health patients reporting that they had been asked to show their medications to a home health care provider decreased from 78.8% to 74.5%.
  - Similar decreases were observed for all racial/ethnic groups.
  - The 2015 achievable benchmark was 85.5%. In 2020, the percentage for Black patients (86.6%) remained above this benchmark. The states contributing to the benchmark are Alabama, Arkansas, Louisiana, Mississippi, Texas, and West Virginia.
- **Groups With Disparities:**
  - Black, Asian, AI/AN, NHPI, and Hispanic home health patients were all more likely than White patients to have been asked to show their medications to a home health care provider (86.6%, 79.1%, 80.8%, 82.1%, and 84.0%, respectively, vs. 73.1%).

Home Health Care Providers Asking To See All Medications, by Age

Adults who reported a home health care provider asking to see all the prescription and over-the-counter medicines they were taking when they first started getting home health care, by age, 2012-2020



Source: Centers for Medicare & Medicaid Services, Consumer Assessment of Healthcare Providers and Systems Home Health Care Survey, 2012-2020.
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 who "do not remember."

- **Groups With Disparities:**
  - Adults age 65 and over were less likely than adults ages 18-44 to have been asked to show their medications to a home health care provider (73.7% vs. 80.7%). This disparity existed in 2012 and has not narrowed over time.
  - The percentage of patients who were asked to show their medications to a home health care provider was similar for adults ages 18-44 and adults ages 45-64 (80.7% vs. 81.1%).

Home Health Care Quality and Safety Resources

Home health care quality and safety resources continue to evolve.

- AHRQ currently offers the CAHPS Home Health Care Survey that asks patients to assess the quality of their home health care experience.
- In 2011, AHRQ and the National Academies of Sciences co-published *Bringing Human Factors Into Home Health Care*, a report examining the impact of health information technology on home health care delivery.

PATIENT SAFETY, HEALTH LITERACY, AND COMMUNICATION

Patient safety and person-centered care are directly related quality domains. Poor communication is a leading cause of patient safety events and poor patient experiences of care (Kohn, et al., 2000; Divi, et al., 2007; Khan, et al., 2020).

- Poor communication can occur between patients and providers and between providers.
- Poor communication can continue to harm patients and families after an adverse event has occurred (Etchegaray, et al., 2014).

Studies show that some adult hospital patients experience poorer communication with their providers based on their race, ethnicity, or educational status (Elliott, et al., 2016; Zhu, et al., 2015; Karter, et al, 2007). Communication gaps occur in all settings of care and are barriers to health equity.

Health Literacy

Healthy People 2030 has two complementary definitions (ODPHP, 2020b) that together constitute health literacy:

- Personal Health Literacy: The degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.
- Organizational Health Literacy: The degree to which organizations equitably enable individuals to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.

Health-literate communication is improving but is far from universal (Liang & Brach, 2017). Many evidence-based health literacy strategies, such as the teach-back method (Schillinger, et al., 2003), can help healthcare organizations be health literate (Koh, et al., 2013).

Even people with adequate personal health literacy can have trouble understanding what to do to attain and maintain good health. Many patients leave their healthcare visit unsure of what their provider asked them to do or what was discussed.

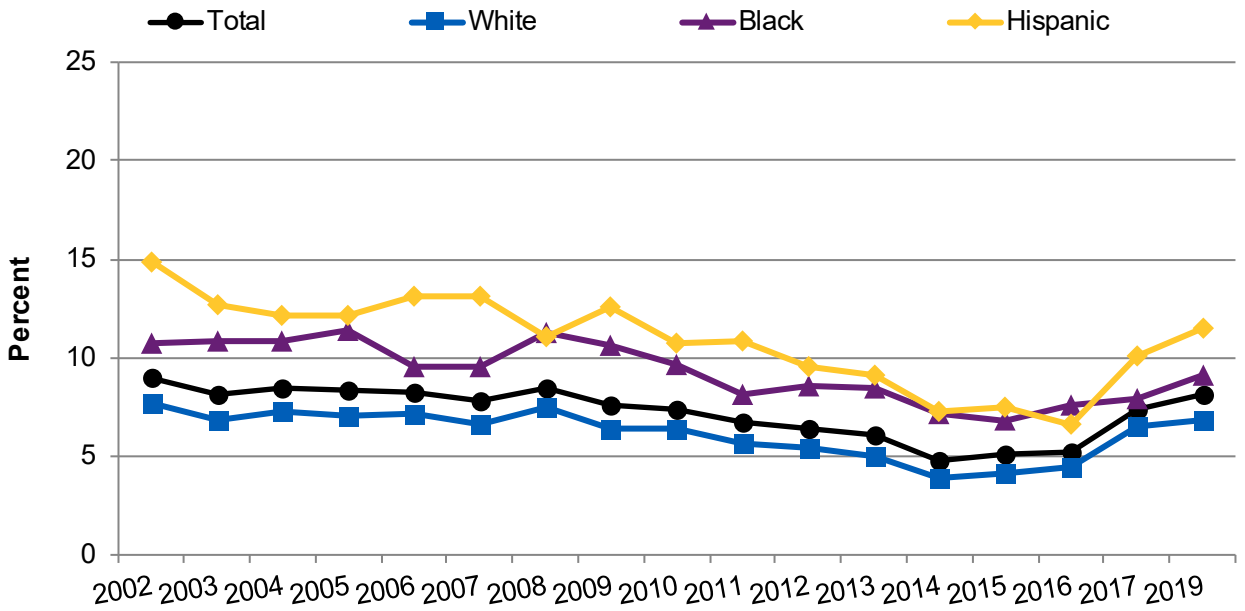
Measures of Communication

- Adults who had a doctor's office or clinic visit in the last 12 months whose health providers sometimes or never explained things in a way they could understand
- Adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions
- Adults who reported that home health providers always explained things in a way that was easy to understand in the last 2 months of care

These measures fall under the person-centered care quality domain within the NHQDR database. They are not included in the summary bar charts shown earlier. These measures are represented in the person-centered care bar shown earlier.

Poor Communication Between Doctors and Patients, by Race/Ethnicity

Adults who had a doctor's office or clinic visit in the last 12 months whose health providers sometimes or never explained things in a way they could understand, by race/ethnicity, 2002-2019

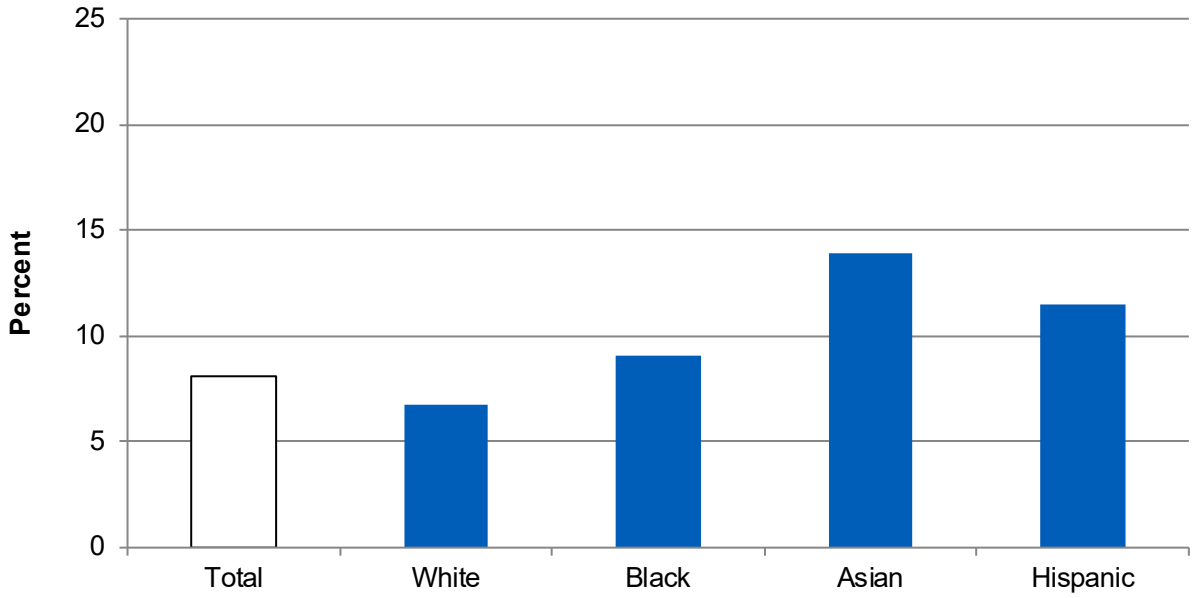


Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2002-2019.
Note: For this measure, lower percentages are better. White and Black are non-Hispanic. Hispanic includes all races. Data were unavailable for 2018.

- **Importance:** When healthcare providers use teach-back with their patients, they ask them to describe in their own words what they heard. If patients cannot teach the information back correctly, providers have to instruct them again using a different way of explaining until patients can correctly teach back what they learned (AHRQ, 2019b). The use of strategies such as teach-back and shared decision making are contributing to improvements in patient-provider communication. Breakdowns in communication still exist and require close examination of modes of communication, implicit bias, and trust building (Boulware, et al., 2003).
- **Overall Percentage:** In 2019, 8.1% of adults who had a doctor's office or clinic visit in the last 12 months had health providers who sometimes or never explained things in a way they could understand.
- **Trends:** The percentage of adults who had a doctor's office or clinic visit in the last 12 months whose health providers sometimes or never explained things in a way they could understand improved from 2002 to 2019 for all racial/ethnic groups.
- **Groups With Disparities:**
  - In 2019, Hispanic adults were more likely than White adults to have a doctor's office or clinic visit in the last 12 months where health providers sometimes or never explained things in a way they could understand (11.5% vs. 6.8%).
  - In 2019, Black adults were more likely than White adults to have a doctor's office or clinic visit in the last 12 months where health providers sometimes or never explained things in a way they could understand (9.1% vs. 6.8%).

Poor Communication Between Doctors and Patients, by Race/Ethnicity

Adults who had a doctor's office or clinic visit in the last 12 months whose health providers sometimes or never explained things in a way they could understand, 2019

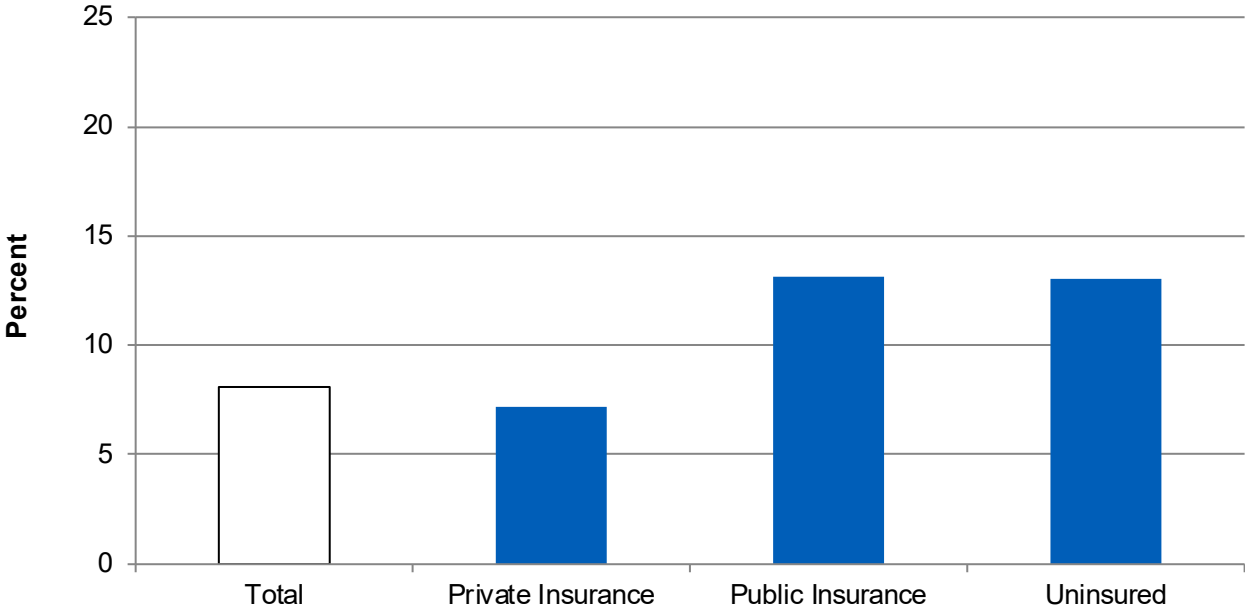


Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2019.
Note: For this measure, lower percentages are better. Data for American Indian and Alaska Native and Native Hawaiian/Pacific Islander populations were not available. White, Black, and Asian are non-Hispanic. Hispanic includes all races.

- **Groups With Disparities:**
  - In 2019, the percentage of adults whose health providers sometimes or never explained things in a way they could understand was higher for Asian patients than for White patients (13.9% vs. 6.8%).
  - In 2019, the percentage of adults whose health providers sometimes or never explained things in a way they could understand was higher for Hispanic patients than for White patients (11.5% vs. 6.8%).
  - In 2019, the percentage of adults whose health providers sometimes or never explained things in a way they could understand was higher for Black patients than for White patients (9.1% vs. 6.8%).

Poor Communication Between Doctors and Patients, by Insurance Status

Adults who had a doctor's office or clinic visit in the last 12 months whose health providers sometimes or never explained things in a way they could understand, by insurance status, 2019

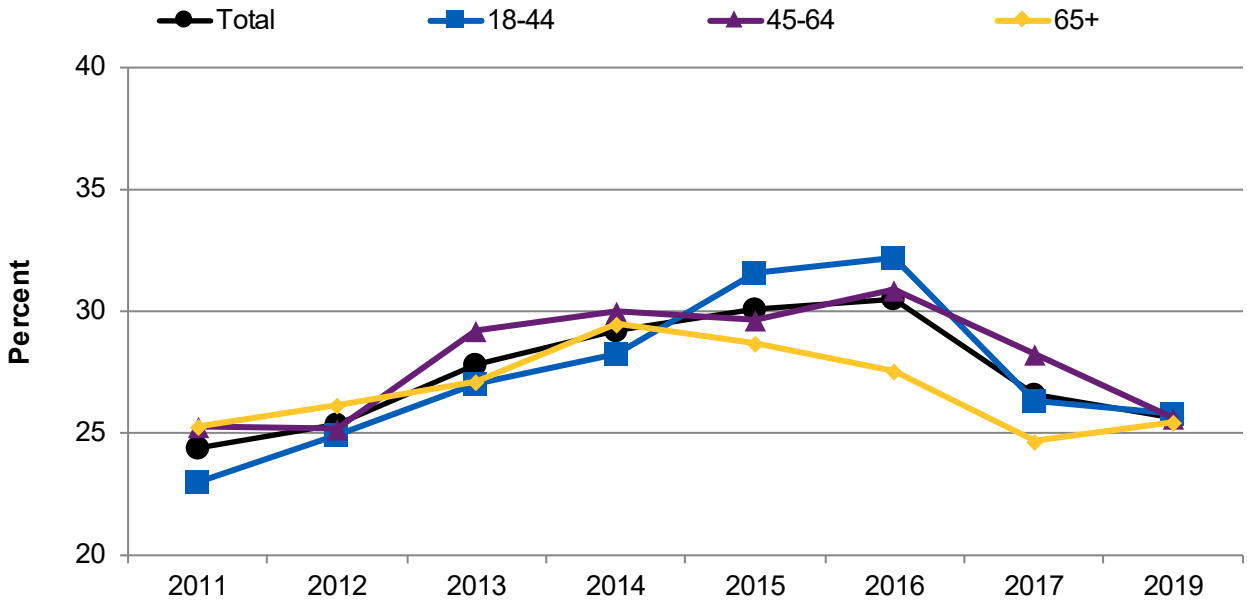


Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2019.
Note: For this measure, lower percentages are better.

- **Groups With Disparities:**
  - In 2019, the percentage of adults whose health providers sometimes or never explained things in a way they could understand was higher for people with public insurance than for people with private insurance (13.1% vs. 7.2%).
  - In 2019, the percentage of adults whose health providers sometimes or never explained things in a way they could understand was higher for uninsured people than for people with private insurance (13.0% vs. 7.2%).
  - In 2019, the percentage of adults whose health providers sometimes or never explained things in a way they could understand was similar for people with public insurance and uninsured people (13.1% vs. 13.0%).

Use of Teach-Back, by Age

Adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions, by age, 2011-2019

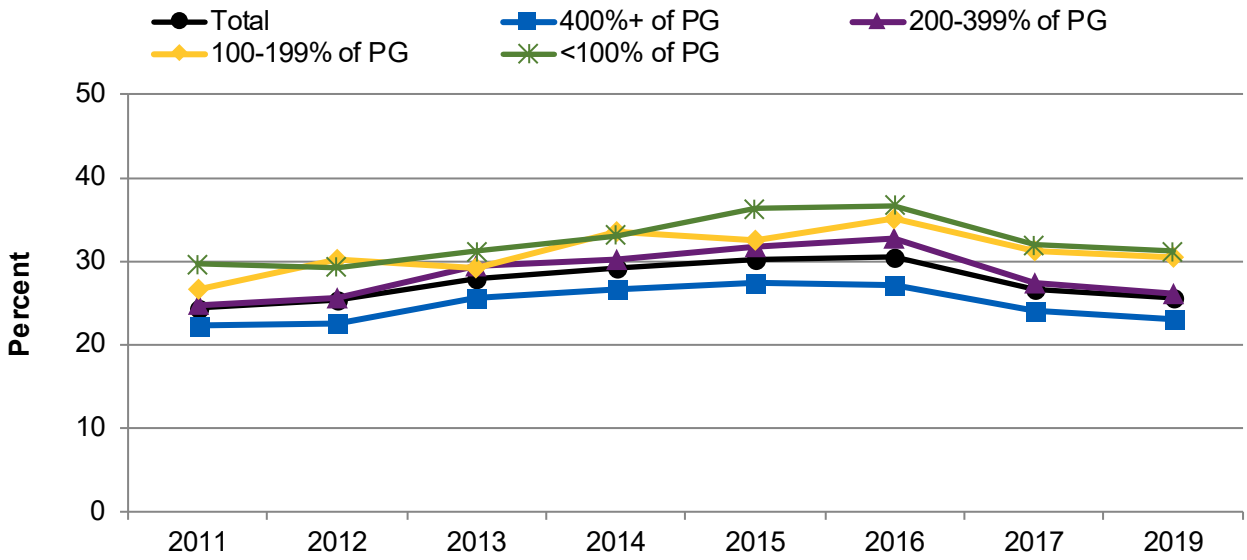


Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2011-2019.
Note: Data were unavailable for 2018.

- **Importance:** Many patients leave their healthcare visit unsure of what their provider asked them to do or what was discussed. Nationwide, only 12% of adults have proficient health literacy (Kutner, et al., 2006). That means almost 9 out of 10 Americans find it challenging "to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (IOM, 2004). The use of strategies such as teach-back and shared decision making are contributing to improvements in patient-provider communication. Breakdowns in communication still exist and require close examination of modes of communication, implicit bias, and trust building (Boulware, et al., 2003).
- **Overall Percentage:** From 2011 to 2019, the percentage of adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions increased from 24.4% to 25.6% but the change was not statistically significant.
- **Trends:** The percentage of adults ages 18-44 years who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions improved from 2011 (23.0%) to 2019 (25.8%). All other age groups had no statistically significant changes over time.
- **Groups With Disparities:**
  - In 2019, the percentages of adults ages 18-44, 45-64, and 65 and over who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions were all similar (25.8%, 25.6%, and 25.5% respectively).

Use of Teach-Back, by Income

Adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions, by income, 2011-2019



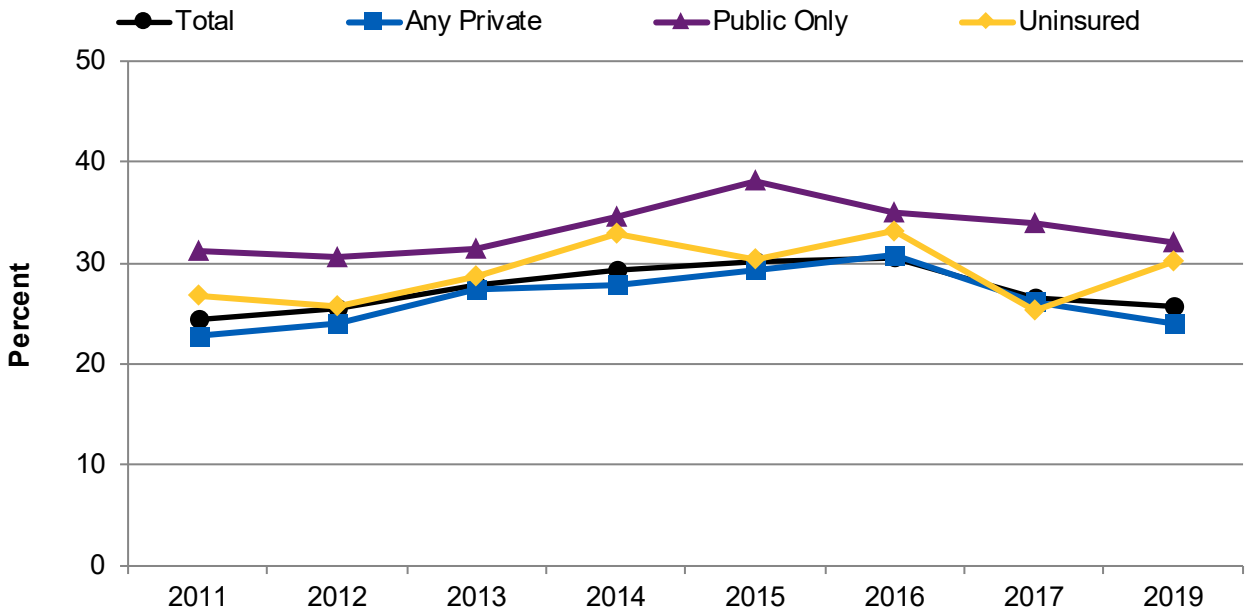
Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2002-2019.
Note: Data were unavailable for 2018. PG refers to the federal poverty guideline.

- **Trends:** The percentage of adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions showed no statistically significant changes over time for all income categories.
  - 400% of PG or more: 22.3% to 23.1%.
  - 200-399% of PG: 24.7% to 26.0%.
  - 100-199% of PG: 26.6% to 30.5%.
  - Less than 100% of PG: 29.6% to 31.1%.

- **Groups With Disparities:**
  - In 2019, the percentage of adults who had a doctor's office or clinic visit in the last 12 months and had health providers always ask them to describe how they will follow the instructions was higher for adults with an income less than 100% of PG compared with adults with an income 400% or more of PG (31.1% vs. 23.1%).
  - In 2019, the percentage of adults who had a doctor's office or clinic visit in the last 12 months and had health providers always ask them to describe how they will follow the instructions was higher for adults with an income 100-199% of PG compared with adults with an income 400% or more of PG (30.5% vs. 23.1%).
  - In 2019, the percentage of adults who had a doctor's office or clinic visit in the last 12 months and had health providers always ask them to describe how they will follow the instructions was higher for adults with an income 200-399% of PG compared with adults with an income 400% for more of PG (26.0% vs. 23.1%).

Use of Teach-Back, by Insurance

Adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions, by insurance, 2011-2019

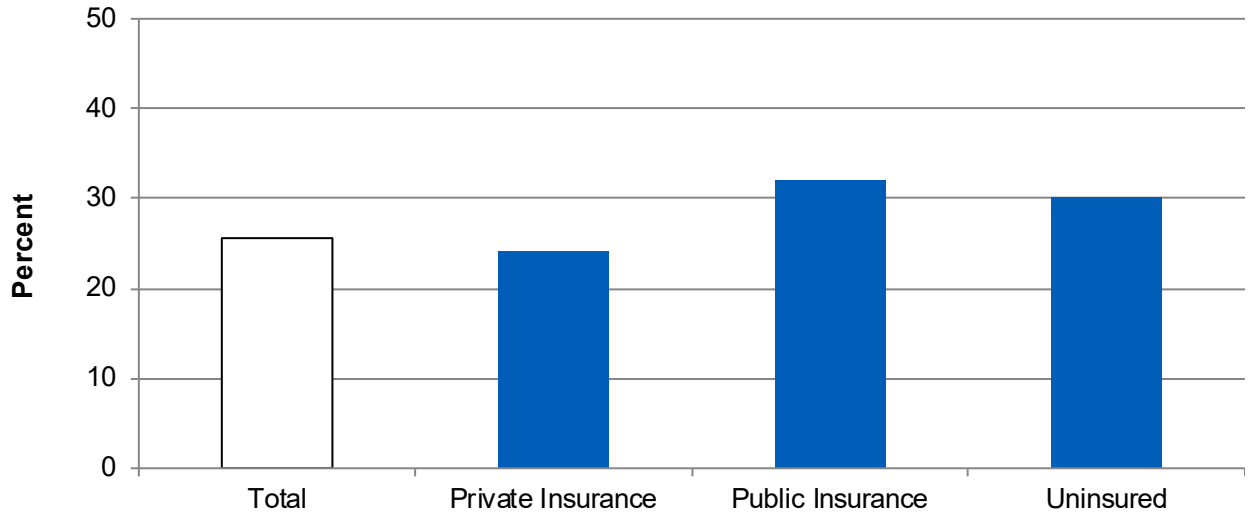


Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2011-2019.
Note: Data were unavailable for 2018.

- **Trends:** From 2011 to 2019, there were no statistically significant changes for any insurance category in the percentage of adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions:
  - Any private: 22.8% to 24.1%
  - Public only: 31.2% to 32.0%
  - Uninsured: 26.8% to 30.1%
- **Groups With Disparities:**
  - In 2019, the percentage of adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions was higher among adults with public insurance and uninsured adults than adults with any private insurance (32.0% and 30.1%, respectively, vs. 24.1%).

Use of Teach-Back, by Insurance

Adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions, by insurance, 2019

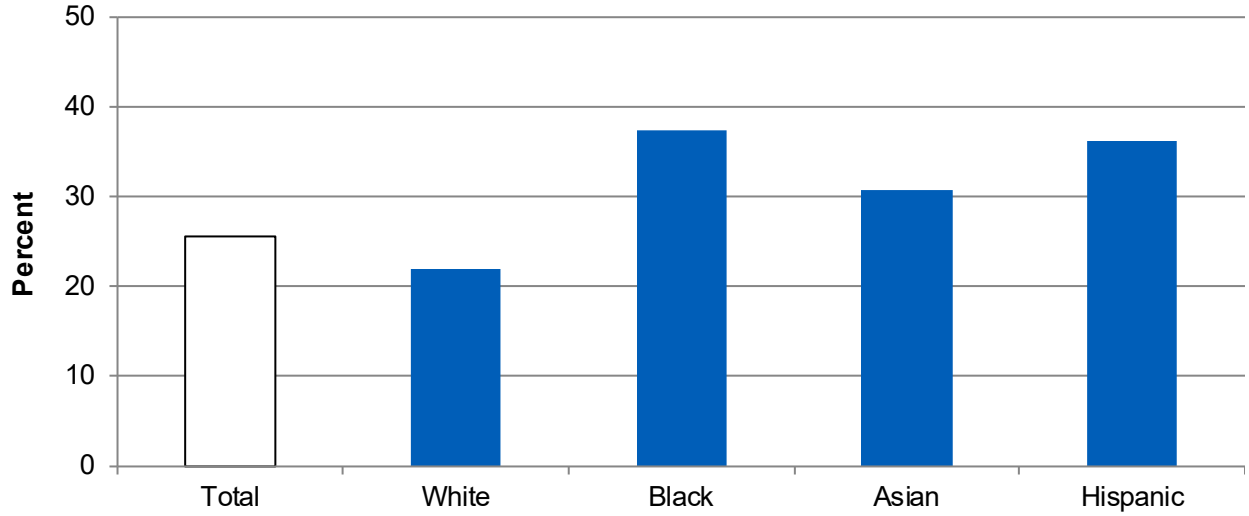


Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2019.

- **Groups With Disparities:**
  - In 2019, the percentage of adults whose health providers always asked them to describe how they will follow the instructions was higher for adults with public insurance (32.0%) and uninsured adults (30.1%) than for adults with private insurance (24.1%).

Use of Teach-Back, by Ethnicity

Adults who had a doctor's office or clinic visit in the last 12 months whose health providers always asked them to describe how they will follow the instructions, by ethnicity, 2019



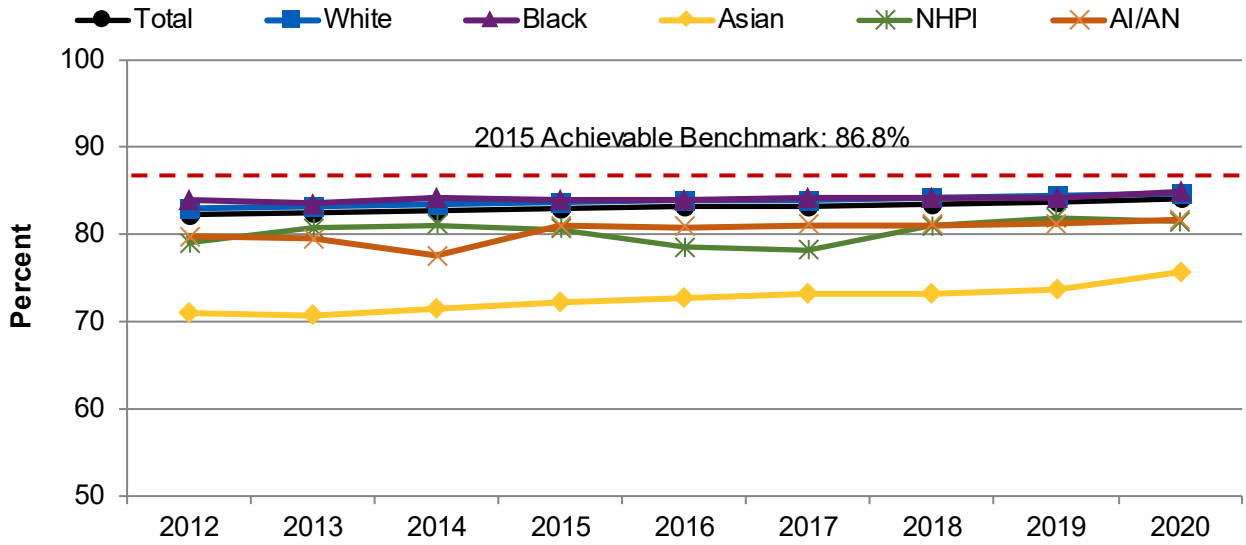
Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2019.
Note: White, Black, and Asian are non-Hispanic. Hispanic includes all races.

Groups With Disparities:

- In 2019, the percentage of adults whose health providers always asked them to describe how they will follow the instructions was higher for non-Hispanic Black adults (37.5%), non-Hispanic Asian adults (30.7%), and Hispanic adults (36.2%) than for non-Hispanic White adults (21.9%).

Adults Whose Home Health Providers Always Explained Things Well, by Race

Adults who reported that home health providers always explained things in a way that was easy to understand in the last 2 months of care, total and by race, 2012-2020



Key: AI/AN = American Indian or Alaska Native, NHPI = Native Hawaiian/Pacific Islander.
Source: Centers for Medicare & Medicaid Services, Home Health Care Consumer Assessment of Healthcare Providers and Systems, 2012-2020.

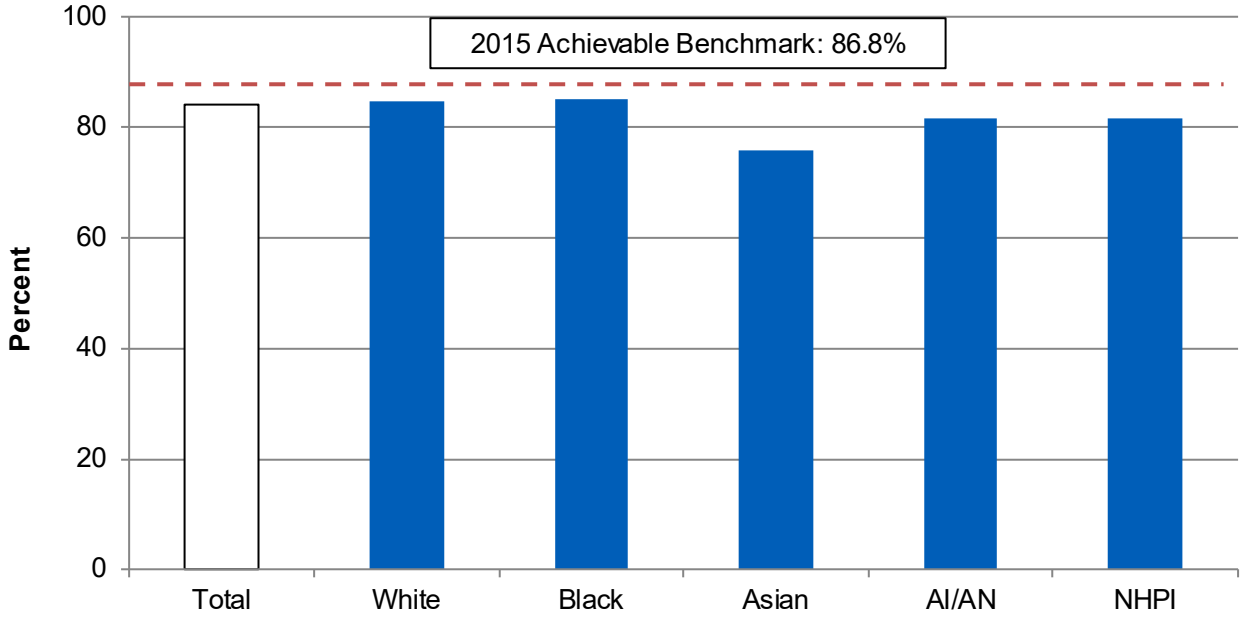
- **Importance:** Overall, effective communication leads to increased patient and clinician satisfaction, increased trust with the clinician, and functional and psychological well-being. Effective communication also leads to improved outcomes in specific diseases, including heart disease, diabetes, and hypertension (Chou, 2018).
- **Overall Percentage:** In 2020, 84.1% of adults reported that home health care providers always explained things in a way that was easy to understand in the last 2 months of care.
- **Trends:** The percentage of adults who had a home health care visit in the last 12 months and had healthcare providers who always explained things in a way they could understand improved from 2012 to 2020:

  - White: 83% to 84.7%. White adults are an estimated 10 years from reaching the 2015 benchmark of 86.8% (The states that contributed to the benchmark are Louisiana, Mississippi, North Carolina, South Carolina, and West Virginia.)
  - Black: 83.9% to 84.9%.
  - Asian: 71.1% to 75.7%. Asian adults are not estimated to reach the 2015 benchmark for more than 20 years.
  - NHPI: 79.0% to 81.5%.
  - AI/AN: 79.8% to 81.7%.

- **Groups With Disparities:**
  - In 2020, the percentage of adults who had a home health care visit in the last 12 months and had healthcare providers who always explained things in a way they could understand was higher among White and Black adults than Asian adults (84.7% and 84.9%, respectively, vs. 75.7%).
  - In 2020, the percentage of adults who had a home health care visit in the last 12 months and had healthcare providers who always explained things in a way they could understand was higher among NHPI adults and AI/AN adults than Asian adults (81.5% and 81.7%, respectively, vs. 75.7%).

Adults Whose Home Health Care Providers Always Explained Things Well, by Race

Adults who reported that home health care providers always explained things in a way that was easy to understand in the last 2 months of care, by race, 2020



Key: AI/AN = American Indian or Alaska Native, NHPI = Native Hawaiian/Pacific Islander.
Source: Centers for Medicare & Medicaid Services, Home Health Care Consumer Assessment of Healthcare Providers and Systems, 2020.

- **Groups With Disparities:**
  - In 2020, there were no statistically significant differences between Blacks and Whites in the percentage of adults who reported that home health care providers always explained things in a way that was easy to understand in the last 2 months of care (84.9% vs. 84.7%).
  - In 2020, AI/AN adults (81.7%), Asian adults (75.7%), and NHPI adults (81.5%) each had a lower percentage than White adults (84.7%) who reported that home health care providers always explained things in a way that was easy to understand in the last 2 months of care.

Tools for Improving Patient Safety and Communication With Patients and Families

AHRQ patient engagement and health literacy tools support improved communication with patients and families. They include:

- Tools for Engaging Patients and Families in Their Health Care, which include the Guide to Improving Patient Safety in Primary Care Settings by Engaging Patients and Families, featuring a teach-back intervention.
- AHRQ's health literacy microsite, which includes improvement tools such as the AHRQ Health Literacy Universal Precautions Toolkit, designed to promote better understanding by all patients.
- Toolkit for Engaging Patients To Improve Diagnostic Safety, which includes the strategies Be The Expert On You and 60 Seconds To Improve Diagnostic Safety that can enhance communication and information sharing within the patient-provider encounter.

PATIENT SAFETY TOOLS, RESOURCES, AND PROGRAMS ACROSS MULTIPLE SETTINGS

Patient safety infrastructure varies by state and healthcare facility. Patient safety and quality issues in ambulatory care settings, hospitals, and medical offices relative to safety culture are described in data from the:

- AHRQ Ambulatory Surgery Center (ASC) Survey on Patient Safety Culture.
- AHRQ Hospital Survey on Patient Safety Culture.
- AHRQ Medical Office Survey on Patient Safety Culture.

The AHRQ Surveys on Patient Safety Culture™ (SOPS®) enable healthcare organizations to assess how their staff perceive various aspects of patient safety culture in their facility or office. Surveys and data are available online:

- Ambulatory Surgery Center Survey on Patient Safety Culture: https://www.ahrq.gov/sops/surveys/asc/index.html.
- Hospital Survey on Patient Safety Culture: https://www.ahrq.gov/sops/surveys/hospital/index.html.
- Medical Office Survey on Patient Safety Culture: https://www.ahrq.gov/sops/surveys/medical-office/index.html.

Surveys on Patient Safety Culture Ambulatory Surgery Center Survey

- Data source: AHRQ 2021 Surveys on Patient Safety Culture Ambulatory Surgery Center (ASC) Database, which includes:
  - Survey data from 8,918 respondents representing 235 ASCs.
  - Data from surveys completed from October 2020 to June 2021.
  - Self-selected and self-reporting sample of U.S. ASCs, representing less than 5% of all ASCs in the United States (ASCA, 2022).
- Results (Famolaro, et al., 2021) provided for:
  - Patient safety culture composite measures, composite measure average.
  - Overall rating on patient safety by composite measure average quartile.

The results presented include the average percent positive response and average percent negative response for each of the eight ASC patient safety culture composite measures and the composite measure average. They also include results for the average percent positive of the overall rating on patient safety in ASCs by the ASC composite measure quartile.

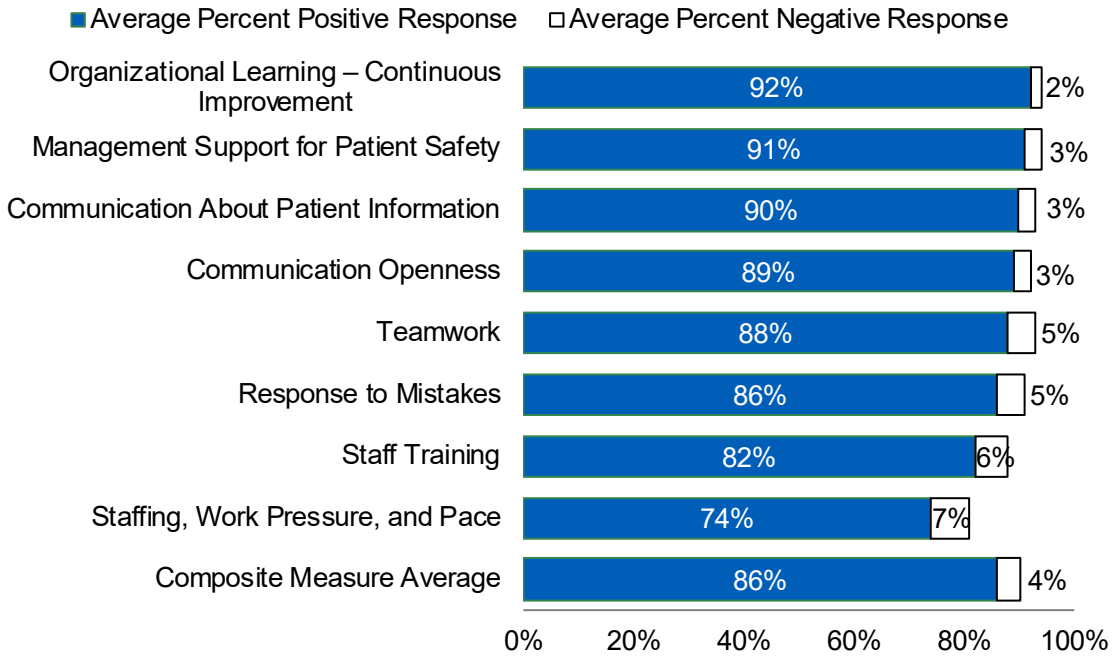
An ASC is defined as an approved ASC in a specific location with a valid CMS Certification Number. Each ASC operates exclusively to provide surgical/procedural services to patients who do not require hospitalization (except in unusual circumstances), and the ASCs do not share space with a hospital or hospital outpatient surgery department.

To be included, ASCs must be located in the United States or in a U.S. territory. Each ASC must have at least five completed surveys. Only current ASC providers and staff are eligible to contribute data.

ASCs, health systems, management companies, or survey vendors that have administered the AHRQ Ambulatory Surgery Center Survey on Patient Safety Culture indicate their interest in participating in the database by registering with AHRQ; interested submitters are notified regarding their eligibility for participation. See https://www.ahrq.gov/sops/surveys/asc/index.html for further information on the survey.

Ambulatory Surgery Center Survey Results

SOPS Ambulatory Surgery Center Survey Results: Average percent positive and negative responses for composite measures, October 2020-June 2021

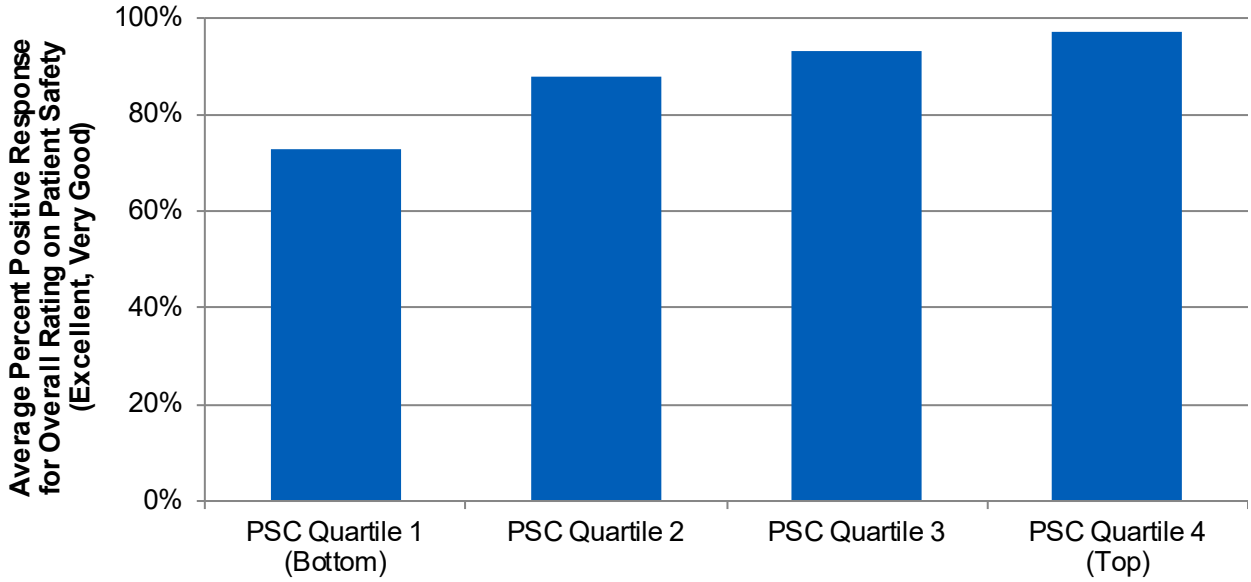


Source: AHRQ SOPS Ambulatory Surgery Center Survey 2021 User Database. Respondents completed the survey between October 2020 and June 2021.
Notes: (1) The composite measure average score is the average of the eight unrounded composite measure scores. (2) For these measures, higher average percent positive is better. Not shown is average percent neutral. (3) The number of ASCs in the Database is 235. (4) Negative percentages ≤5% are shifted to the right of the chart.

- **Importance**: As ASCs aim to improve their performance, there is growing recognition of the importance of establishing a culture of patient safety by looking at the patient safety culture areas viewed as most positive and most negative by ASC staff.
- **Areas of Strength and Weakness:**
  - Organizational Learning – Continuous Improvement had the highest average percent positive response (92 percent positive) and lowest percent negative response (2 percent negative).
  - Staffing, Work Pressure, and Pace had the lowest average percent positive response (74 percent positive) and the highest average percent negative response (7 percent negative).

Ambulatory Surgery Center Survey Results, Overall Rating

SOPS Ambulatory Surgery Center Survey Results: Overall rating on patient safety ("Excellent" and "Very Good") by PSC quartile, October 2020-June 2021



Key: PSC = Patient Safety Culture.
Source: Westat analysis of the AHRQ 2021 SOPS Ambulatory Surgery Center Survey Database. Respondents completed the survey between October 2020 and June 2021.
Note: An ASC's patient safety culture score is the average of the unrounded percent positive scores across all 8 composite measures in the SOPS Ambulatory Surgery Center Survey. The range of patient safety culture scores by quartile are: 56% - <83% for quartile 1; 83% - <88% for quartile 2; 88% - <92% for quartile 3; and 92% - 99% for quartile 4. ASC providers and staff were asked how they would rate their ASC on patient safety. Response categories include: "Poor," "Fair," "Good," "Very good," and "Excellent." ASCs without responses for all survey composite measures were excluded.

- **Importance:** ASCs with an overall rating of "Excellent" or "Very good" on patient safety also have more positive perceptions of how well they are doing in general.
- **Results:**
  - An overall rating on patient safety of "Excellent" or "Very good" was higher among respondents in ASCs with higher patient safety culture scores (top quartile, PSC quartile 4) compared with ASCs with lower patient safety culture scores (bottom quartile, PSC quartile 1).
  - The difference in the average percent positive score on the overall patient safety rating in ASCs with the lowest patient safety culture scores compared with ASCs with the highest patient safety culture scores was 24 percentage points.

Surveys on Patient Safety Culture Hospital Survey 2.0

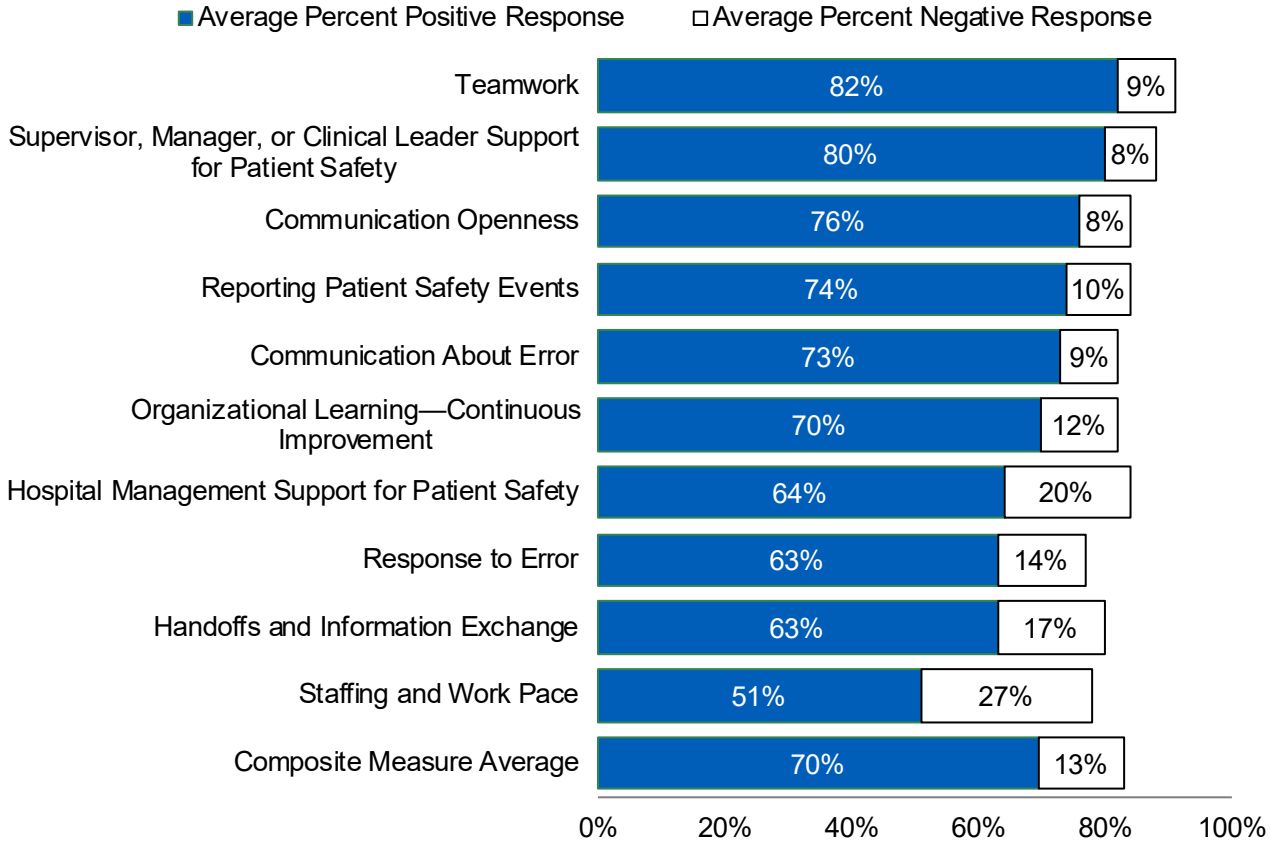
- Data source: AHRQ 2022 SOPS Hospital Survey 2.0 Database, which includes:
  - Survey data from 206,410 respondents representing 400 hospitals.
  - Data from surveys completed from November 2020 to July 2022.
  - Self-selected sample of U.S. hospitals, including less than 7% of all hospitals.

- Results (Hare, Tapia, et al., 2022) provided for:
  - Patient safety culture composite measures, composite measure average.
  - Overall rating on patient safety by composite measure average quartile.

The results presented include the average percent positive response and average percent negative response for each of the 10 Hospital 2.0 patient safety culture composite measures and the composite measures average. They also include results for the average percent positive of the overall rating on patient safety in hospitals by the Hospital 2.0 composite measure quartile.

Hospital Survey 2.0 Results

SOPS Hospital Survey 2.0 Results: Average percent positive and negative responses for composite measures, November 2020-July 2022



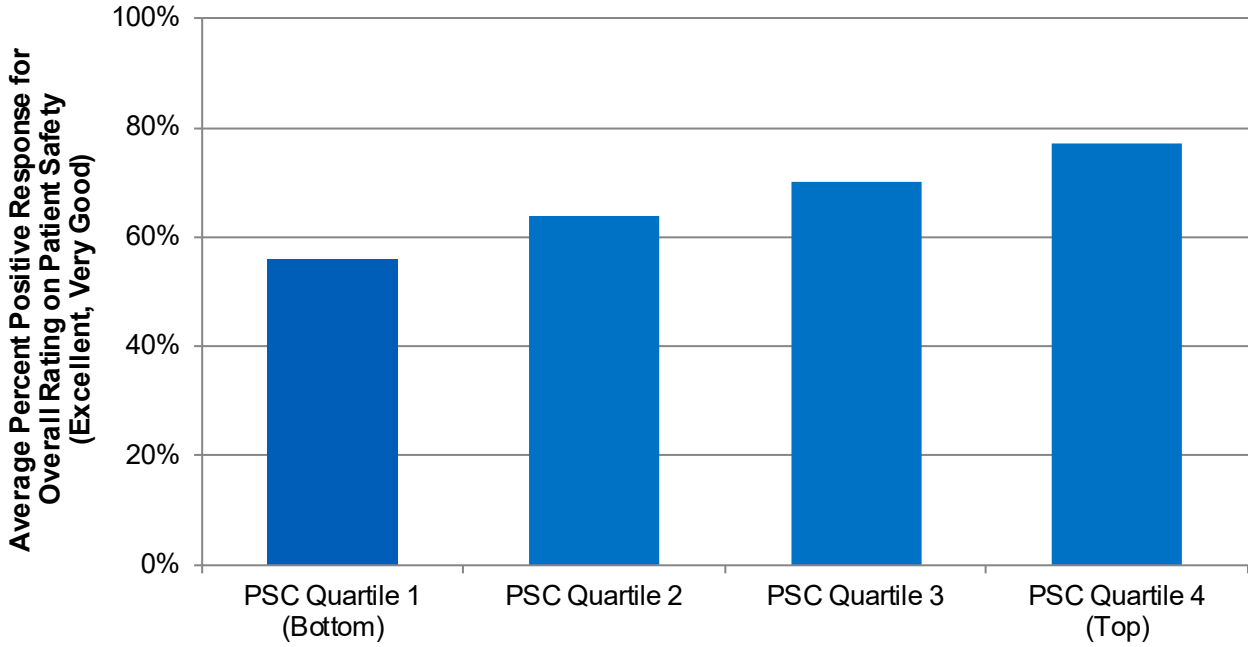
Source: AHRQ SOPS Hospital Survey 2.0 2022 User Database. Respondents completed the survey between November 2020 and July 2022.
Notes: (1) The composite measure average score is the average of the 10 unrounded composite measure scores. (2) For these measures, higher average percent positive is better. Not shown is average percent neutral. (3) The number of hospitals in the Database is 400.

- **Importance:** As hospitals aim to improve their performance, there is growing recognition of the importance of establishing a culture of patient safety by looking at the patient safety culture areas viewed most positive and most negative by hospital staff and providers.

- **Areas of Strength and Weakness:**
  - Teamwork had the highest average percent positive response (82 percent positive). Staffing and Work Pace had the lowest average percent positive response (51 percent positive).
  - Supervisor, Manager, or Clinical Leader Support for Patient Safety and Communication Openness had the lowest average percent negative response (8 percent negative). Staffing and Work Pace had the highest average percent negative response (27 percent negative).

Hospital Survey 2.0 Results, Overall Rating

SOPS Hospital Survey 2.0 Results: Overall rating on patient safety ("Excellent" and "Very Good") by PSC quartile, November 2020-July 2022



Key: PSC = Patient Safety Culture.
Source: Westat analysis of the AHRQ Hospital Survey 2.0 2022 Database. Respondents completed the survey between November 2020 and July 2022.
Note: A hospital's patient safety culture score is the average of the unrounded percent positive scores across all 10 composite measures in the SOPS Hospital Survey 2.0. The range of patient safety culture scores by quartile are: 39% - <65% for quartile 1; 65% - <70% for quartile 2; 70% - <75% for quartile 3; and 75% - 85% for quartile 4. Hospital providers and staff were asked how they would rate their unit/work area on patient safety. Response categories include: "Poor," "Fair," "Good," "Very good," and "Excellent." Hospitals without responses for all survey composite measures were excluded.

- **Importance:** Hospitals with an overall rating of "Excellent" or "Very good" on patient safety also have more positive perceptions of how well they are doing in general.
- **Results:**
  - An overall rating on patient safety of "Excellent" or "Very good" was higher among respondents in hospitals with higher patient safety culture composite measure average scores (top quartile) compared with hospitals with lower patient safety culture composite measure average scores (bottom quartile).

- The difference in the average percent positive score on the overall patient safety rating in hospitals with the lowest patient safety culture scores compared with hospitals with the highest patient safety culture scores was 21 percentage points.

Surveys on Patient Safety Culture Workplace Safety Supplemental Item Set for Hospitals

- Data source: 2022 AHRQ SOPS Workplace Safety Supplemental Item Set for Hospitals Database, which includes:

  - Responses from 11,710 respondents representing 40 hospitals.
  - Data from surveys completed from May 2021 to July 2022.
  - Self-selected sample of U.S. hospitals, including less than 1% of all hospitals in the United States.

The supplemental item set was administered toward the end of the SOPS Hospital Survey 2.0, before the background questions.

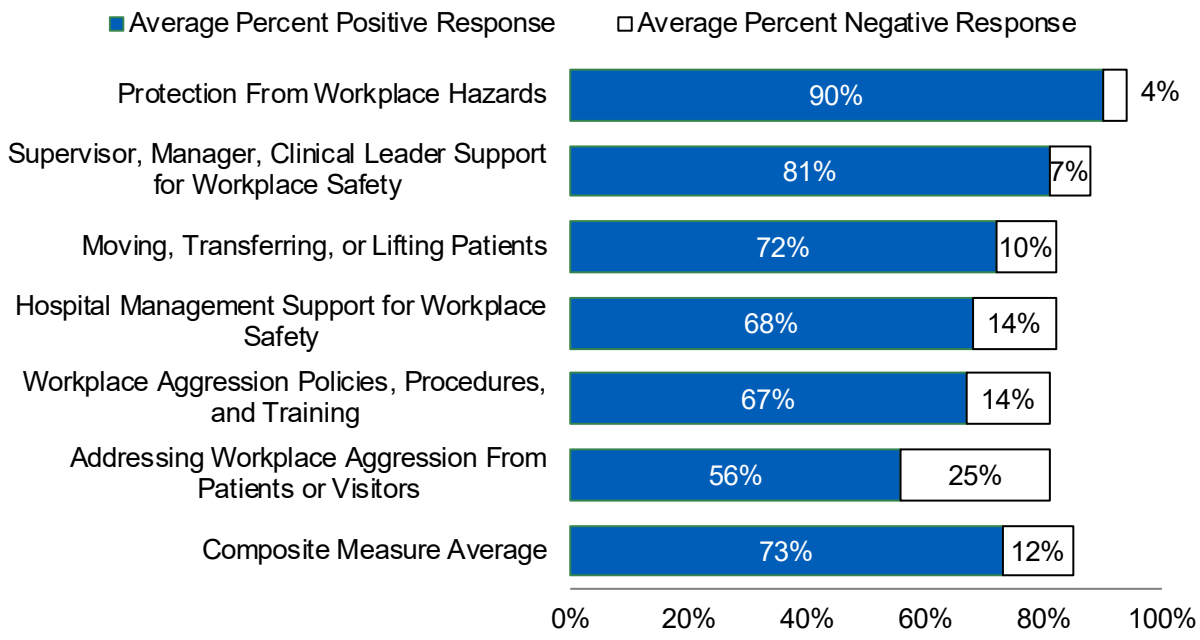
- Results (Hare, Tyler, et al., 2022) provided for:

  - Workplace safety composite measures, composite measure average.
  - Overall rating on workplace safety by composite measure average quartile.

The results presented include the average percent positive response and average percent negative response for each of the 6 composite measures and the composite measure average, which is the average of the unrounded composite measure scores. Results also include data for the single item measures, including the work stress/burnout item. Finally, results include the average percent positive of the overall rating on workplace safety by the workplace safety composite measure quartile.

Hospital Workplace Safety Survey Results

SOPS Hospital Workplace Safety Supplemental Item Set Results: Average percent positive and negative responses for composite measures, May 2021-July 2022

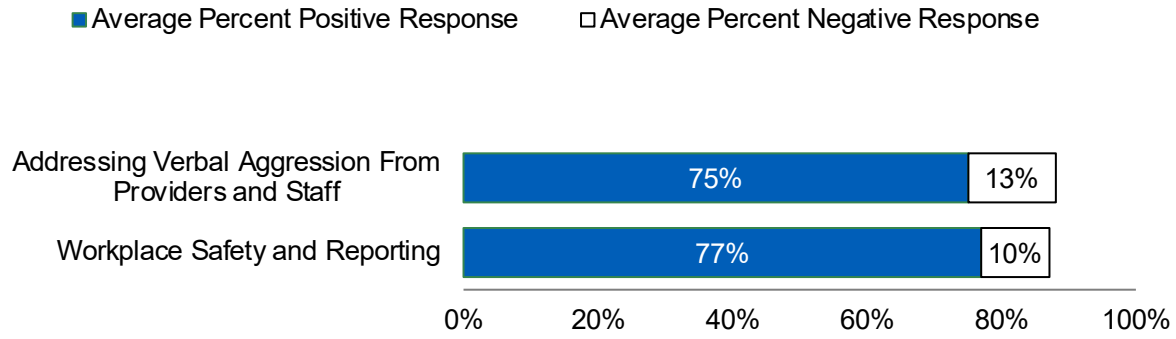


Source: 2022 AHRQ SOPS Workplace Safety Supplemental Item Set for Hospitals Database. Respondents completed the survey between May 2021 and July 2022.
Notes: (1) The composite measure average score is the average of the six unrounded composite measure scores. (2) For these measures, higher average percent positive is better. Not shown is average percent neutral. (3) The Database includes 40 hospitals. (4) Average percent negative percentages less than 5% are shifted to the right of the chart.

- **Importance:** As hospitals aim to improve their performance on workplace safety, assessing a culture of workplace safety can help hospitals identify areas viewed by providers and staff as most positive and most negative.
- **Areas of Strength and Weakness:**
  - Protection From Workplace Hazards had the highest average percent positive response (90 percent positive) and lowest percent negative response (4 percent negative).
  - Addressing Workplace Aggression From Patients or Visitors had the lowest average percent positive response (56 percent positive) and the highest percent negative response (25 percent negative).

Hospital Workplace Safety Survey Results for Single Item Measures

SOPS Hospital Workplace Safety Supplemental Item Set Results: Average percent positive and negative responses for single item measures, May 2021-July 2022



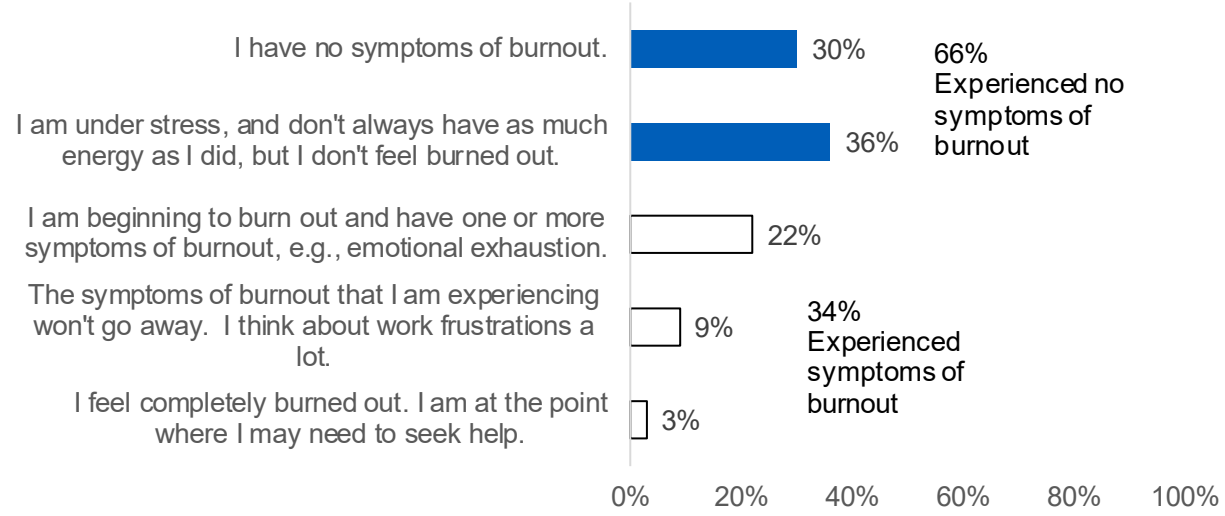
Source: 2022 AHRQ SOPS Workplace Safety Supplemental Item Set for Hospitals Database. Respondents completed the survey between May 2021 and July 2022.
Note: For these measures, higher average percent positive is better. Not shown is average percent neutral. The Database includes 40 hospitals.

- Results:
  - The average percent positive response for Addressing Verbal Aggression From Providers and Staff was 75% and the average percent negative response was 13%.
  - The average percent positive response for Workplace Safety and Reporting was 77% and the average percent negative response was 10%.

Hospital Workplace Safety Supplemental Item Set Results, Work Stress and Burnout

SOPS Hospital Workplace Safety Supplemental Item Set Results: Work Stress and Burnout, May 2021-July 2022

Using your own definition of "burnout," please select one of the answers below:

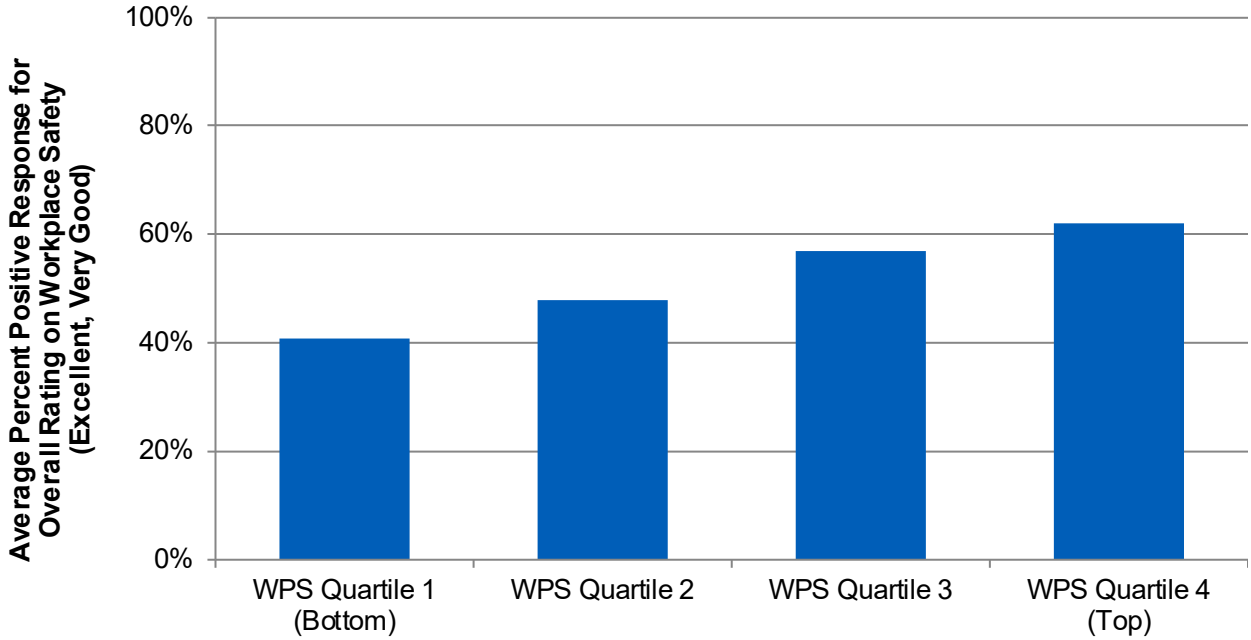


Source: 2022 AHRQ SOPS Workplace Safety Supplemental Item Set for Hospitals Database. Respondents completed the survey between May 2021 and July 2022.
Note: The Database includes 40 hospitals.

- **Importance:** As hospitals aim to improve their performance on workplace safety, assessing a culture of workplace safety, including burnout, can help hospitals identify the areas viewed by providers and staff as most positive and most negative.
- **Results:** Nearly two-thirds (66%) of respondents experienced no symptoms of burnout, while 34% experienced symptoms of burnout.

Hospital Workplace Safety, Overall Rating

SOPS Hospital Workplace Safety Supplemental Item Set Results: Overall rating on workplace safety ("Excellent" and "Very Good") by WPS quartile, May 2021-July 2022



Key: WPS = Workplace Safety Culture.
Source: Westat analysis of the AHRQ Workplace Safety Supplemental Item Set for Hospitals Database. Respondents completed the survey between May 2021 and July 2022.
Note: A hospital's workplace safety culture score is the average of the unrounded percent positive scores across all 6 composite measures in the SOPS Workplace Safety Supplemental Item Set for Hospitals. The range of workplace safety scores by quartile are: 57% - <68% for quartile 1; 68% - <72% for quartile 2; 72% - <79% for quartile 3; and 79% - 84% for quartile 4. Hospital providers and staff were asked how they would rate their unit/work area on workplace safety. Response categories include: "Poor," "Fair," "Good," "Very good," and "Excellent." Hospitals without responses for all survey composite measures were excluded.

- **Importance:** Hospitals with an overall rating of "Excellent" or "Very good" on workplace safety also have more positive perceptions of how well they are doing in general.
- **Results:**
  - An overall rating on workplace safety of "Excellent" or "Very good" was higher among respondents in hospitals with higher workplace safety culture composite measure average scores (WPS quartile 4) compared with hospitals with lower workplace safety culture composite measure average scores (WPS quartile 1).
  - The difference in the average percent positive score on the overall workplace safety rating in hospitals with the lowest workplace safety culture scores compared with hospitals with the highest workplace safety culture scores was 21 percentage points.

Surveys on Patient Safety Culture Medical Office Survey

- Data source: AHRQ 2022 SOPS Medical Office Database, which includes:
  - Survey data from 13,277 respondents representing 1,100 medical offices.
  - Data from surveys completed from November 2019 to October 2021.
  - Self-selected sample of U.S. medical offices, including less than 1% of all medical offices in the United States.
- Results (Famolaro, Hare, Tapia, Taie-Tehrani, et al., 2022) provided for:
  - Patient safety culture composite measures, composite measure average.
  - Overall rating on patient safety by composite measure average quartile.

The results presented include the average percent positive and average percent negative for each of the 10 medical office patient safety culture composite measures and the composite measure average. Results also include the average percent positive of the overall rating on patient safety in medical offices by the medical office composite measure average quartile.

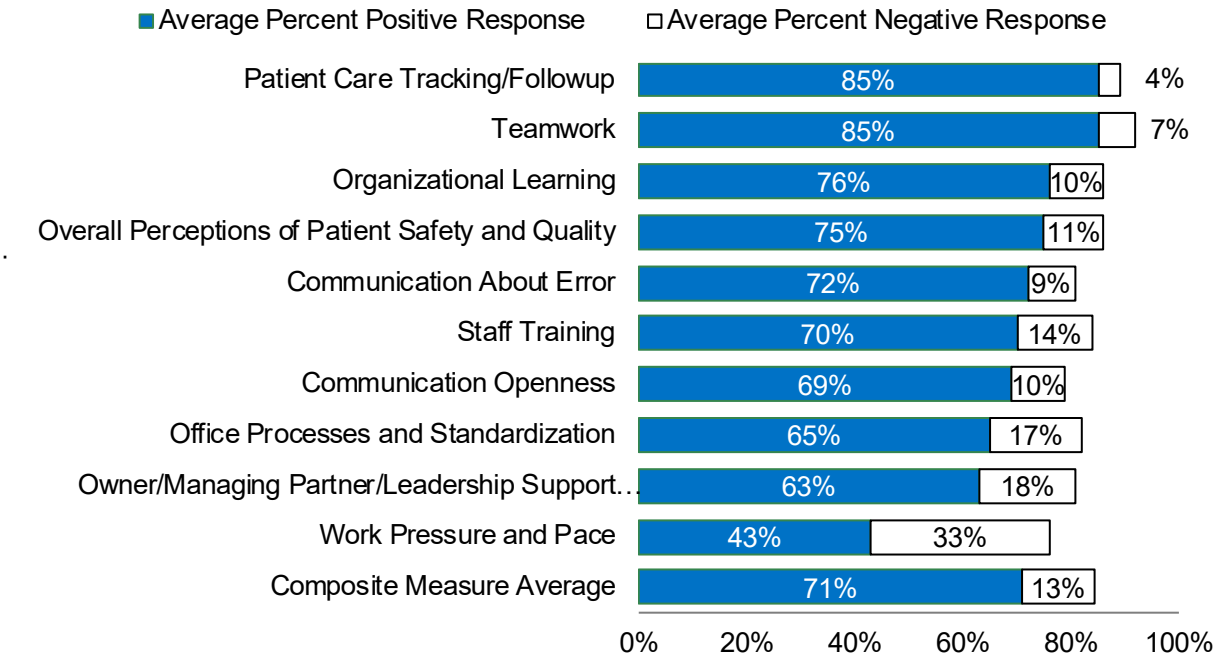
Medical Offices in the SOPS Medical Office Database

- A medical office is an outpatient facility in a specific location.
- Each medical office located in a building containing multiple medical offices is considered a separate medical office.
- If there are multiple providers in a single medical office, a medical office is defined as any providers who share administrative and clinical support staff.

To be included, medical offices must be located in the United States or in a U.S. territory. Each medical office must have at least 5 completed surveys. Only current medical office providers and staff are eligible to contribute data. Medical offices, health systems, or survey vendors that have administered the AHRQ Medical Office Survey on Patient Safety Culture indicate their interest in participating in the database by registering with AHRQ; interested submitters are notified regarding their eligibility for participation. See https://www.ahrq.gov/sops/databases/medical-office/submission.html for further information on the survey.

Medical Office Survey Results

SOPS Medical Office Survey Results: Average percent positive and negative responses for composite measures, November 2019-October 2021

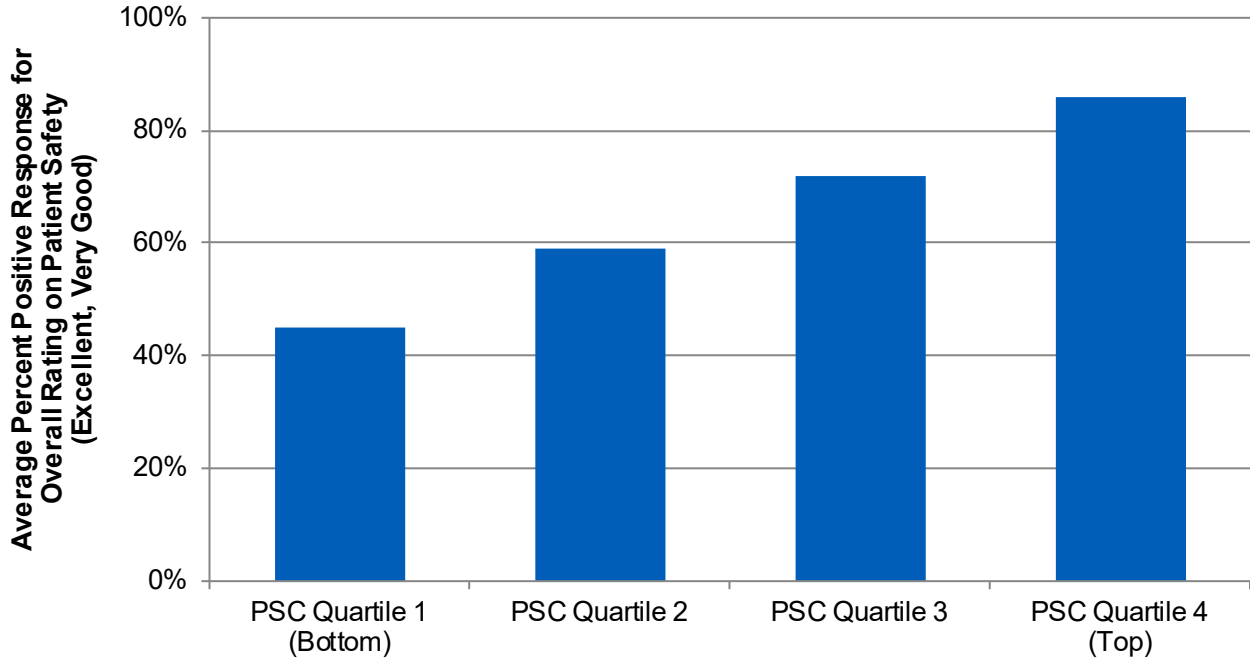


Source: AHRQ SOPS Medical Office Survey 2022 User Database. Respondents completed the survey between November 2019 and October 2021.
Note: (1) The composite measure average score is the average of the 10 unrounded composite measure scores. (2) For these measures, higher average percent positive is better. Not shown is average percent neutral. (3) The number of medical offices in the Database is 1,100. (4) Average percent negative percentages ≤7% are shifted to the right of the chart.

- **Importance:** As medical offices aim to improve their performance, there is growing recognition of the importance of establishing a culture of patient safety by looking at the patient safety culture areas viewed by providers and staff as most positive and most negative.
- **Areas of Strength and Weakness:**
  - Patient Care Tracking/Followup and Teamwork had the highest average percent positive responses (85 percent positive) and lowest percent negative responses (4 and 7 percent negative, respectively).
  - Work Pressure and Pace had the lowest average percent positive response (43 percent positive) and the highest percent negative response (33 percent negative).

Medical Office Survey Results, Overall Rating

SOPS Medical Office Survey Results: Overall rating on patient safety ("Excellent" and "Very Good") by PSC quartile, November 2019-October 2021



Key: PSC = Patient Safety Culture.
Source: Westat analysis of the AHRQ 2022 SOPS Medical Office Survey Database. Respondents completed the survey between November 2019 and October 2021.
Note: A medical office's patient safety culture score is the average of the unrounded percent positive scores across all 10 composites in the Medical Office Survey on Patient Safety Culture. The range of patient safety culture scores by quartile are: 26% - <61% for quartile 1; 61% - <72% for quartile 2; 72% - <81% for quartile 3; and 81% - 98% for quartile 4. Providers and staff were asked how they would rate their medical office on patient safety. Response categories include: "Poor," "Fair," "Good," "Very good," and "Excellent." Medical offices without responses for all survey composite measures were excluded.

- **Importance:** The medical office overall rating on patient safety reflects medical office respondent perceptions of how well they are doing in general.
- **Results:**
  - An overall rating on patient safety of "Excellent" or "Very good" was higher among respondents in medical offices with higher patient safety culture composite measure average scores (top quartile) compared with medical offices with lower patient safety culture composite measure average scores (bottom quartile).
  - The difference in the average percent positive overall rating on patient safety between PSC quartile 4 and PSC quartile 1 was 41 percentage points.

Surveys on Patient Safety Culture Diagnostic Safety Supplemental Item Set for Medical Offices

- Data source: AHRQ 2022 SOPS Medical Office Database, which includes:
  - Responses from 1,126 respondents representing 110 medical offices.
  - Data from surveys completed from September 2020 to October 2021.
  - Self-selected sample of U.S. medical offices, representing less than 1% of all medical offices in the United States.

The supplemental item set was administered toward the end of the SOPS Medical Office Survey, before the background questions.

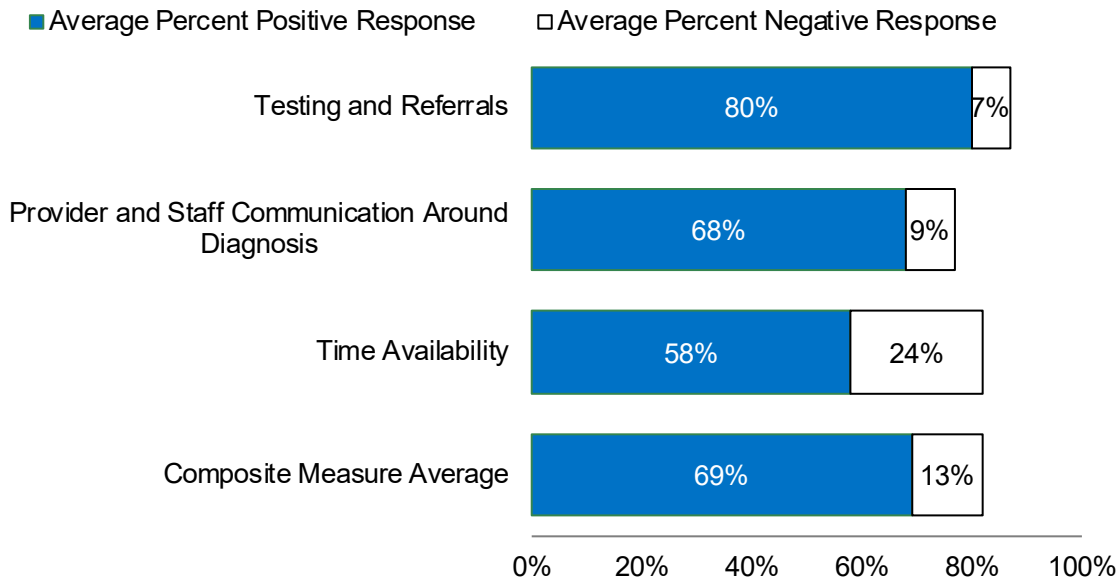
- Results (Famolaro, Hare, Tapia, Fan, et al., 2022) provided for:
  - Diagnostic safety composite measures, composite measure average.

The results presented include the average percent positive and average percent negative for each of the 3 diagnostic safety composite measures and the composite measure average, which is the average of the unrounded composite measure scores.

Medical offices are defined as noted above and interested survey participants must register with AHRQ, also as noted above.

Medical Office Diagnostic Safety Supplemental Item Set Results

SOPS Medical Office Diagnostic Safety Supplemental Item Set Results: Average percent positive and negative responses for composite measures, September 2020-October 2021



Source: 2022 AHRQ SOPS Diagnostic Safety Supplemental Item Set Database. Respondents completed the survey between September 2020 and October 2021.
Notes: (1) The composite measure average score is the average of the three unrounded composite measure scores. (2) For these measures, higher average percent positive is better. Not shown is average percent neutral. (3) The number of medical offices in the Database is 110.

- **Importance:** As medical offices aim to support the diagnostics process, accurate diagnoses, and communication around diagnoses, assessing a culture of diagnostic safety can help medical offices identify areas viewed by providers and staff as most positive and most negative.
- **Areas of Strength and Weakness:**
  - Testing and Referrals had the highest average percent positive response (80 percent positive) and lowest percent negative response (7 percent negative).
  - Time Availability had the lowest average percent positive response (58 percent positive) and the highest percent negative response (24 percent negative).

Patient Safety Organization Program

Infrastructure for patient safety improvement varies by state and healthcare facility. The AHRQ Patient Safety Organization (PSO) Program was created as a result of the Patient Safety and Quality Improvement Act of 2005 (PSQIA) (available at https://pso.ahrq.gov/legislation). AHRQ supports implementation of the PSQIA except for the confidentiality and related enforcement provisions delegated to the Office for Civil Rights.

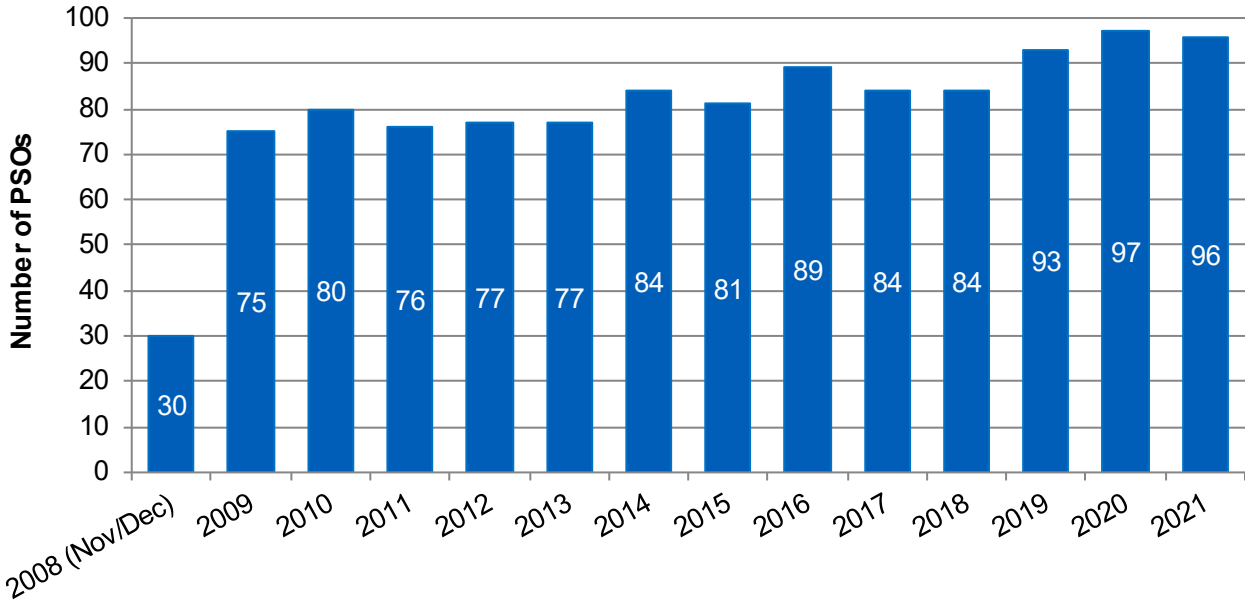
PSOs engage with healthcare providers in patient safety and healthcare quality improvement activities. When a provider works with a PSO, many of the following long-recognized impediments to successful improvement projects can be overcome:

- **Provider fear of increased liability from participating in quality initiatives:** The law provides confidentiality protections and privilege protections (inability to introduce the protected information in a legal proceeding) when certain requirements are met.
- **Inability of all licensed or certified healthcare facilities and clinicians to participate:** Unlike state protections that often target hospitals or physicians, these protections are broad.
- **Lack of nationwide and uniform protections:** These protections are especially valuable for systems with facilities in multiple states; a corporate system can share its protected data systemwide with all of its affiliated providers if it chooses to do so.
- **Insufficient volume:** Patient safety events are often too rare for a facility to identify causal factors with certainty. Each provider benefits from the insights it can obtain from a PSO that aggregates large volumes of event data from multiple providers. Moreover, their data remain protected even when the PSO aggregates them with data from other providers.
- **Inability to protect deliberations or analyses at a facility:** The law permits providers to undertake deliberations and analyses at their facilities that become protected as patient safety work product immediately as long as they are conducted in the provider's Patient Safety Evaluation System.

More information on how to become a Patient Safety Organization is available at https://pso.ahrq.gov/become_PSO.

Number of Patient Safety Organizations

Total number of Patient Safety Organizations by year, 2008-2021



Source: Agency for Healthcare Research and Quality, Patient Safety Organizations Program, 2008-2021.
Note: The counts represent the total number of listed PSOs recorded by December 31 each year. This measure is not included in the summary analysis.

- **Importance:** The PSO program has grown over time, and most participating PSOs have remained continuously listed since their initial listing dates. This continuity allows the PSOs to work closely with contracted providers to support quality and safety activities that fulfill eight requirements:
  - Efforts to improve patient safety and the quality of healthcare delivery
  - Collection and analysis of patient safety work product
  - Development and dissemination of information with respect to improving patient safety, such as recommendations, protocols, and information regarding best practices
  - Use of patient safety work product for the purposes of encouraging a culture of safety and providing feedback and assistance to effectively minimize patient risk
  - Maintenance of procedures to preserve confidentiality with respect to patient safety work product
  - Provision of appropriate security measures with respect to patient safety work product
  - Use of qualified staff
  - Activities related to the operation of a patient safety evaluation system and provision of feedback to participants in a patient safety evaluation system
- **Past Data on the Number of New PSOs Listed, annually:** The number of new PSOs that have joined the program have differed, annually. Over the past 11 years, these were the total number of new PSOs each year:
  - 2008: 30 PSOs
  - 2009: 45 PSOs

- 2010: 19 PSOs
- 2011: 13 PSOs
- 2012: 13 PSOs
- 2013: 8 PSOs
- 2014: 12 PSOs
- 2015: 6 PSOs
- 2016: 12 PSOs
- 2017: 5 PSOs
- 2018: 4 PSOs
- 2019: 9 PSOs
- 2020: 4 PSOs
- 2021: 0 PSOs

Most Frequent PSO Specialties Reported on the 2021 PSO Profile

PSO Specialty	Frequency	Percentage
All Medical Specialties	39	62.9%
Anesthesiology	4	6.5%
Neurology	4	6.5%
Pediatrics	4	6.5%
Radiology (diagnostic and interventional)	5	8.1%
Surgery	6	9.7%
Other	10	16.1%

Source: PSO Privacy Protection Center analysis of 2021 AHRQ PSO Profile data.
Note: Each of the PSO specialties included in this list was identified by a total of four or more PSOs, representing at least 6.5% of the PSOs reporting. This PSO Profile question is a check all that apply question; therefore, the sum of percentages may exceed 100%. Sixty-two PSOs reported specialty focus in the 2021 PSO Profile. A PSO can report more than one specialty focus. This measure is not included in the summary analysis.

- PSO specialties cover the full spectrum of medical specialties, with more than half (39/62) of PSOs providing data reporting that they work with all medical specialties. PSOs may report more than one specialty.
- The following PSO specialties are available in the 2021 PSO Profile: All Medical Specialties, Anesthesiology, Cardiology, Colorectal Surgery, Dentistry, Dermatology, Emergency Medicine/EMS, Family Medicine, Gastroenterology, General Surgery, Internal Medicine, Neurology, Neurological Surgery, Nuclear Medicine, Nursing, Obstetrics/Gynecology, Oncology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Pathology, Pediatrics, Pediatric Surgery, Pharmacy, Physical Medicine and Rehabilitation, Plastic Surgery, Podiatry, Psychiatry, Pulmonology, Radiology, Thoracic Surgery, Urology, Vascular Surgery, Allied Health Professionals.

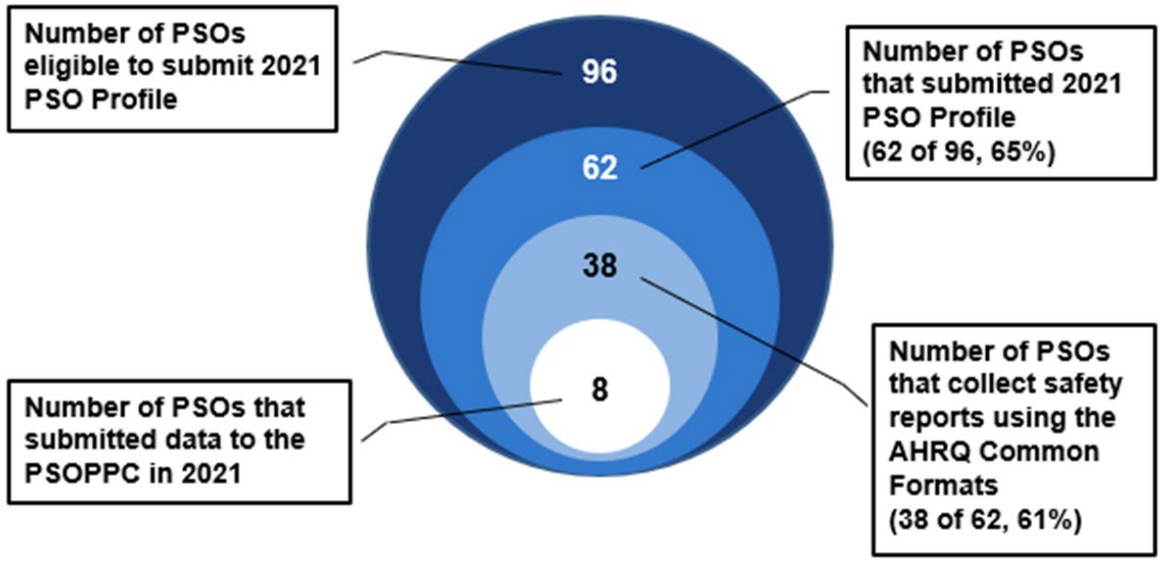
Types of Providers Contracted With PSOs, by Provider Type, 2018-2021

Provider Type	2018 (N = 5,088)	2019 (N = 8,330)	2020 (N=64,416)	2021 (N=68,718)
General Hospitals	2,001 (39.3%)	2,158 (25.9%)	2,509 (3.9%)	2,810 (4.1%)
Specialty Hospitals	520 (10.2%)	523 (6.3%)	664 (1.0%)	111 (0.2%)
Critical Access Hospitals	157 (3.1%)	176 (2.1%)	362 (0.6%)	359 (0.5%)
Licensed Practitioner Groups	1,610 (31.6%)	3,765 (45.2%)	5,948 (9.2%)	6,992 (10.2%)
Specialized Treatment Facilities (e.g., Behavioral, Chemotherapy, Dialysis, Psychiatric)	69 (1.4%)	58 (0.7%)	205 (0.3%)	342 (0.5%)
Long-Term Care (includes Skilled Nursing Facilities or Intermediate/ Long-Term Care Facilities and Assisted Living Facilities)	77 (1.5%)	43 (0.5%)	233 (0.4%)	220 (0.3%)
Retail Pharmacy	15 (0.3%)	2 (0.0%)	5,245 (8.1%)	3,547 (5.2%)
Other*	639 (12.6%)	1,605 (19.3%)	49,282 (76.5%)	54,337 (79.1%)

* Other includes all categories not specifically identified above (e.g., Urgent care/emergency medicine).
Source: PSO Privacy Protection Center analysis of 2021 AHRQ PSO Profile data.
Note: Sixty-two PSOs reported provider type details in the 2021 PSO Profile. Percentages may not add to 100 due to rounding. This measure is not included in the summary analysis.

- While the PSO program continues to have a strong presence working with hospital providers, the providers contracted with PSOs span a large portion of the continuum of care.
- The trend presents the diversity of the types of providers contracted with PSOs and shows that the patient safety events reported are not limited to those that occur in a hospital setting.
- Changes in the number of providers within each type occur for several reasons, including listing of new PSOs, delisting of PSOs no longer participating in the program, changes in what PSOs voluntarily provide these data, and changes in the composition of provider types among contracted providers.

PSO Data Submission



Source: PSO Privacy Protection Center (PSOPPC) analysis of 2021 AHRQ PSO Profile data.
Note: As of calendar year 2021, the PSOPPC dataset includes data submitted by 17 PSOs across Common Formats for Event Reporting-Hospital V1.1, V1.2, and V2.0.

- Thirty-eight PSOs have collected data using the AHRQ Common Formats for Event Reporting-Hospital (CFER-H) V1.1, V1.2, and V2.0.
- Eight PSOs submitted data to the PSO Privacy Protection Center (PSOPPC) during calendar year 2021.

Through 2021, the PSOPPC only accepted data compliant with CFER-H. Currently, the PSOPPC accepts data that comply with the AHRQ Common Formats for Event Reporting for diagnostic safety (CFER-DS), nursing home (CFER-NH), and community pharmacy (CFER-CP) events.

Although only a small percentage of PSOs submit the data to the PSOPPC using the CFER-H specifications, more than 60% of PSOs collect patient safety reports. These data indicate that opportunities remain to improve the collection and reporting of patient safety data in hospitals and other settings.

Network of Patient Safety Databases and the National Learning System

- The Network of Patient Safety Databases (NPSD) is part of the national learning system of providers, AHRQ, and AHRQ-listed PSOs (see figure below).
- The data collected by the PSOPPC are designed to support measurement and improvement of patient safety in hospitals.
- Once data are collected, aggregated, deidentified, and submitted to the NPSD, they can provide insights about improvements in patient care, which in turn can advance patient safety. More information is available on AHRQ's website at https://www.ahrq.gov/npsd/quality-patient-safety/index.html.

NPSD and the National Learning System

REFERENCES

Abe K, Kuklina EV, Hooper WC, Callaghan WM. Venous thromboembolism as a cause of severe maternal morbidity and mortality in the United States. Semin Perinatol. 2019 Jun;43(4):200-204. Epub 2019 Mar 9. https://pubmed.ncbi.nlm.nih.gov/30935751/. Accessed February 16, 2023.

Adams MM, Alexander GR, Kirby RS, Wingate MS. Perinatal Epidemiology for Public Health Practice. New York, NY: Springer US; 2009.

Agency for Healthcare Research and Quality. AHRQ National Scorecard on Hospital-Acquired Conditions: Updated Baseline Rates and Preliminary Results 2014-2017. 2019a. https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/pfp/hacreport-2019.pdf. Accessed February 16, 2023.

Agency for Healthcare Research and Quality. The Falls Management Program: A Quality Improvement Initiative for Nursing Facilities. Chapter 1. Introduction and Program Overview. Content last reviewed December 2017. https://www.ahrq.gov/patient-safety/settings/long-term-care/resource/injuries/fallspx/man1.html. Accessed February 16, 2023.

Agency for Healthcare Research and Quality. More Effort Is Needed To Ensure Patients Understand Doctors' Instructions. 2019b. AHRQ Publication No. 18(19)-0033-8-EF. https://www.ahrq.gov/sites/default/files/wysiwyg/research/findings/nhqrdr/dataspotlight-health-literacy.pdf. Accessed February 16, 2023.

Agency for Healthcare Research and Quality. Patient Safety Primer: Health Care-Associated Infections. https://psnet.ahrq.gov/primers/primer/7. 2019c. Accessed February 16, 2023.

Agency for Healthcare Research and Quality. Patient Safety Primer: Maternal Safety. https://psnet.ahrq.gov/primers/primer/50/Maternal-Safety. 2019d. Accessed February 16, 2023.

Alliance for Home Health Quality and Innovation. Home Health Chartbook 2021. Prepared by Avalere Health, September 2021. https://ahhqi.org/images/uploads/AHHQI_2021_Home_Health_Chartbook_FINAL.pdf. Accessed February 16, 2023.

Ambulatory Surgery Center Association. Number of ASCs per State. Based on data provided by the Centers for Medicare & Medicaid Services (CMS), December 2022. https://www.ascassociation.org/advancingsurgicalcare/asc/numberofascsperstate. Accessed February 16, 2023.

American College of Obstetricians and Gynecologists and the Society for Maternal–Fetal Medicine, Kilpatrick SK, Ecker JL. Severe maternal morbidity: screening and review. Am J Obstet Gynecol. 2016 Sep;215(3):B17-B22. https://pubmed.ncbi.nlm.nih.gov/27560600/. Accessed February 16, 2023.

Au Y, Holbrook M, Skeens A, Painter J, McBurney J, Cassata A, Wang SC. Improving the quality of pressure ulcer management in a skilled nursing facility. Int Wound J. 2019 Apr;16(2):550-555. doi: 10.1111/iwj.13112. Epub 2019 Mar 12. https://pubmed.ncbi.nlm.nih.gov/30864302/. Accessed February 16, 2023.

Bateman BT, Shaw KM, Kuklina EV, Callaghan WM, Seely EW, Hernandez-Diaz S. Hypertension in women of reproductive age in the United States: NHANES 1999-2008. PLoS ONE. 2012;7(4):36171. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3340351/. Accessed February 16, 2023.

Boulware LE, Cooper LA, Ratner LE, La Veist TA, Powe NR. Race and trust in the health care system. Public Health Rep. 2003 Jul-Aug;118(4):358-365. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1497554/. Accessed February 16, 2023.

Centers for Disease Control and Prevention. Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-Central Line-Associated Bloodstream Infection. Device-Associated Module. January 2021a. https://www.cdc.gov/nhsn/pdfs/pscmanual/4psc_clabscurrent.pdf. Accessed February 16, 2023.

Centers for Disease Control and Prevention. Maternal Mortality. Frequently Asked Questions. 2020a. https://www.cdc.gov/nchs/maternal-mortality/faq.htm. Accessed February 16, 2023.

Centers for Disease Control and Prevention. Pregnancy Mortality Surveillance System. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-mortality-surveillance-system.htm. 2020b. Accessed February 16, 2023.

Centers for Disease Control and Prevention. Urinary Tract Infection (Catheter-Associated Urinary Tract Infection [CAUTI] and Non-Catheter-Associated Urinary Tract Infection [UTI]) Events. Device-Associated Module. January 2023. http://www.cdc.gov/nhsn/pdfs/pscmanual/7psccauticurrent.pdf. Accessed February 16, 2023.

Centers for Disease Control and Prevention. Vital Signs. Pregnancy-Related Deaths. Updated May 2019. https://www.cdc.gov/vitalsigns/maternal-deaths/index.html. Accessed February 16, 2023.

Chou C. Time to start using evidence-based approaches to patient engagement. NEJM Catalyst 2018 Mar 28. https://catalyst.nejm.org/evidence-based-patient-provider-communication/. Accessed February 16, 2023.

Divi C, Koss RG, Schmaltz SP, Loeb JM. Language proficiency and adverse events in U.S. hospitals: a pilot study. Int J Qual Health Care. 2007 Apr;19(2):60-67. https://pubmed.ncbi.nlm.nih.gov/17277013/. Accessed February 16, 2023.

Dudeck MA, Edwards JR, Allen-Bridson K, Gross C, Malpiedi PJ, Peterson KD, Pollock DA, Weiner LM, Sievert DM. National Healthcare Safety Network report, data summary for 2013, Device-associated Module. Am J Infect Control. 2015 Mar 1;43(3):206-221. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4653815/. Accessed February 16, 2023.

Elliott AM, Alexander SC, Mescher CA, Mohan D, Barnato AE. Differences in physicians' verbal and nonverbal communication with Black and White patients at the end of life. J Pain Symptom Manage. 2016;51(1):1-8. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4698224/. Accessed February 16, 2023.

Etchegaray JM, Ottosen MJ, Burress L, Sage WM, Bell SK, Gallagher TH, Thomas EJ. Structuring patient and family involvement in medical error event disclosure and analysis. Health Aff (Millwood). 2014 Jan;33(1):46-52. https://pubmed.ncbi.nlm.nih.gov/24395934/. Accessed February 16, 2023.

Famolaro T, Hare R, Tapia A, Fan L, Ji, S., Yount ND, Gray, L., Zebrak, K., Sorra J. 2022 Updated Results for the AHRQ Surveys on Patient Safety Culture™ (SOPS®) Diagnostic Safety Supplemental Items for Medical Offices Survey. Prepared by Westat, Rockville, MD, under Contract No. HHSP233201500026I/HHSP23337004T). Rockville, MD: Agency for Healthcare Research and Quality; April 2022. AHRQ Publication No. 22-0027. https://www.ahrq.gov/sites/default/files/wysiwyg/sops/surveys/medical-office/DxSftyRpt-Updated-2022.pdf. Accessed February 16, 2023.

Famolaro T, Hare R, Tapia A, Taie-Tehrani S, Fan L, Liu H, Yount ND, Sorra J. Surveys on Patient Safety Culture™ (SOPS®) Medical Office Survey: 2022 User Database Report. (Prepared by Westat, Rockville, MD, under Contract No. HHSP233201500026I/HHSP23337004T). Rockville, MD: Agency for Healthcare Research and Quality; March 2022. AHRQ Publication No. 22-0017. https://www.ahrq.gov/sites/default/files/wysiwyg/sops/surveys/medical-office/2022-MOSOPS-Database-Report-Part-I-508.pdf. Accessed February 16, 2023.

Famolaro T, Hare R, Tapia A, Yount ND, Fan L, Liu H, Sorra J. Surveys on Patient Safety Culture™ (SOPS®) Ambulatory Surgery Center Survey: 2021 User Database Report. (Prepared by Westat, Rockville, MD, under Contract No. HHSP233201500026I/HHSP23337004T). Rockville, MD: Agency for Healthcare Research and Quality; December 2021. AHRQ Publication No. 22-0004. https://www.ahrq.gov/sites/default/files/wysiwyg/sops/surveys/asc/Part-I-SOPS-ASC-DatabaseReport.pdf. Accessed February 16, 2023.

Fasano HT, McCarter MSJ, Simonis JM, Hoelscher GL, Bullard MJ. Influence of socioeconomic bias on emergency medicine resident decision making and patient care. Simul Healthc. 2020 Jul 2. https://pubmed.ncbi.nlm.nih.gov/32649585/. Accessed February 16, 2023.

Fingar KR, Hambrick MM, Heslin KC, Moore JE. Trends and Disparities in Delivery Hospitalizations Involving Severe Maternal Morbidity, 2006–2015. 2018 Sep 4. In: Healthcare Cost and Utilization Project (HCUP) Statistical Briefs [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2006 Feb. Statistical Brief #243. https://www.hcup-us.ahrq.gov/reports/statbriefs/sb243-Severe-Maternal-Morbidity-Delivery-Trends-Disparities.jsp. Accessed February 16, 2023.

Gyamfi-Bannerman C, Srinivas SK, Wright JD, Goffman D, Siddiq Z, D'Alton ME, Friedman AM. Postpartum hemorrhage outcomes and race. Am J Obstet Gynecol. 2018 Aug;219(2):185.e1-185.e10. https://pubmed.ncbi.nlm.nih.gov/29752934/. Accessed February 16, 2023.

Hare R, Tapia A, Tyler ER, Fan L, Ji S, Yount ND, Sorra J, Famolaro T. Surveys on Patient Safety Culture™ (SOPS®) Hospital Survey 2.0: 2022 User Database Report. (Prepared by Westat, Rockville, MD, under Contract No. HHSP233201500026I/HHSP23337004T). Rockville, MD: Agency for Healthcare Research and Quality; October 2022. AHRQ Publication No. 22(23)-0066. https://www.ahrq.gov/sites/default/files/wysiwyg/sops/surveys/hospital/2022-hsops2-database-report.pdf. Accessed February 16, 2023.

Hare R, Tyler, ER., Tapia A, Fan L, Ji, S., Yount ND, Zebrak, K., Gray, L., Sorra J., Famolaro, T. 2022 Updated Results for the AHRQ Surveys on Patient Safety Culture™ (SOPS®) Workplace Safety Supplemental Items for Hospitals. Prepared by Westat, Rockville, MD, under Contract No. HHSP233201500026I/HHSP23337004T). Rockville, MD: Agency for Healthcare Research and Quality; November 2022. AHRQ Publication No. 22(23)-0008. https://www.ahrq.gov/sites/default/files/wysiwyg/sops/surveys/hospital/2022-hsops-wps-study-report.pdf. Accessed February 16, 2023.

Harris-Kojetin L, Sengupta M, Lendon JP, Rome V, Valverde R, Caffrey C. Long-term care providers and services users in the United States, 2015-2016. National Center for Health Statistics. Vital Health Stat 3(43). 2019. https://www.cdc.gov/nchs/data/series/sr_03/sr03_43-508.pdf. Accessed February 16, 2023.

Institute of Medicine. Health Literacy: A Prescription To End Confusion. Washington, DC: National Academies Press; 2004. https://www.nap.edu/catalog/10883/health-literacy-a-prescriptiontoend-confusion. Accessed February 16, 2023.

Kaiser Family Foundation. State Health Facts. Total Number of Residents in Certified Nursing Facilities. Timeframe: 2019. https://www.kff.org/other/state-indicator/number-of-nursing-facility-residents/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D. Accessed February 16, 2023.

Karter AJ, Stevens MR, Brown AF, Duru OK, Gregg EW, Gary TL, Beckles GL, Tseng CW, Marrero DG, Waitzfelder B, Herman WH, Piette JD, Safford MM, Ettner SL. Educational disparities in health behaviors among patients with diabetes: the Translating Research Into Action for Diabetes (TRIAD) Study. BMC Public Health. 2007 Oct 29;7:308. https://www.ncbi.nlm.nih.gov/pmc/articles/ PMC2238766/. Accessed February 16, 2023.

Khan A, Yin HS, Brach C, Graham DA, Ramotar MW, Williams DN, Spector N, Landrigan CP, Dreyer BP; Patient and Family Centered I-PASS Health Literacy Subcommittee. Association between parent comfort with English and adverse events among hospitalized children. JAMA Pediatr. 2020 Dec 1;174(12):e203215. https://pubmed.ncbi.nlm.nih.gov/33074313/. Accessed February 16, 2023.

Koh HK, Brach C, Harris LM, Parchman ML. A proposed 'health literate care model' would constitute a systems approach to improving patients' engagement in care. Health Aff. 2013;32(2):357-367. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5102011/. Accessed February 16, 2023.

Kohn LT, Corrigan JM, Donaldson MS, eds.; Committee on Quality of Health Care in America, Institute of Medicine. To Err Is Human: Building a Safer Health System. Washington, DC: National Academy Press; 2000. http://www.nap.edu/catalog/9728.html. Accessed February 16, 2023.

Kutner M, Greenberg E, Jin Y, Paulsen C. The Health Literacy of America's Adults: Results From the 2003

National Assessment of Adult Literacy. Washington, DC: National Center for Education Statistics; 2006. Publication No. NCES 2006-483. https://nces.ed.gov/pubs2006/2006483_1.pdf. Accessed February 16, 2023.

Liang L, Brach C. Health literacy universal precautions are still a distant dream: analysis of U.S. data on health literate practices. Health Lit Res Pract. 2017 Oct;1(4):e216-e230. Epub 2017 Nov 9. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5706771/. Accessed February 16, 2023.

Lim W. Using low molecular weight heparin in special patient populations. J Thromb Thrombolysis 2010 Feb;29(2):233-240. https://www.ncbi.nlm.nih.gov/pubmed/19902146. Accessed February 16, 2023.

Lobo BL. Use of newer anticoagulants in patients with chronic kidney disease. Am J Health Syst Pharm 2007;64(19):2017-2026. https://www.ncbi.nlm.nih.gov/pubmed/17893411. Accessed February 16, 2023.

Magill SS, Edwards JR, Bamberg W, Beldavs ZG, Dumyati G, Kainer MA, Lynfield R, Maloney M, McAllister-Hollod L, Nadle J, Ray SM, Thompson DL, Wilson LE, Fridkin SK; Emerging Infections Program Healthcare-Associated Infections and Antimicrobial Use Prevalence Survey Team. Multistate point-prevalence survey of health care-associated infections. N Engl J Med 2014;370:1198-1208. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4648343/. Accessed February 16, 2023.

Medline Plus. Eclampsia. National Library of Medicine; 2021a. https://medlineplus.gov/ency/article/000899.htm. Accessed February 16, 2023.

Medline Plus. Preeclampsia. National Library of Medicine; 2021b. https://medlineplus.gov/ency/article/000898.htm. Accessed February 16, 2023.

Metersky ML, Hunt DR, Kliman R, Wang Y, Curry M, Verzier N, Lyder CH, Moy E. Racial disparities in the frequency of patient safety events: results from the National Medicare Patient Safety Monitoring System. Med Care. 2011 May;49(5):504-510. https://pubmed.ncbi.nlm.nih.gov/21494115/. Accessed February 16, 2023.

National Association for Home Care & Hospice. Basic Statistics About Home Care. Updated 2010. http://www.nahc.org/wp-content/uploads/2017/10/10hc_stats.pdf. Accessed February 16, 2023.

Ngwenya S. Postpartum hemorrhage: incidence, risk factors, and outcomes in a low-resource setting. Int J Womens Health. 2016;8:647-650. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5098756/. Accessed February 16, 2023.

Noursi S, Saluja B, Richey L. Using the ecological systems theory to understand Black/White disparities in maternal morbidity and mortality in the United States. J Racial Ethn Health Disparities. 2020 Jul 27. https://pubmed.ncbi.nlm.nih.gov/32720294/. Accessed February 16, 2023.

Office of Disease Prevention and Health Promotion. National Action Plan for ADE Prevention. U.S. Department of Health and Human Services. 2020a. https://health.gov/about-odphp/previous-initiatives/national-ade-action-plan. Accessed February 16, 2023.

Office of Disease Prevention and Health Promotion. Health Literacy in Healthy People 2030. 2020b. https://health.gov/our-work/healthy-people-2030/about-healthy-people-2030/health-literacy-healthy-people. Accessed February 16, 2023.

Petersen EE, Davis NL, Goodman D, Cox S, Mayes N, Johnston E, Syverson C, Seed K, Shapiro-Mendoza CK, Callaghan WM, Barfield W. Vital Signs: Pregnancy-related deaths, United States, 2011-2015, and strategies for prevention, 13 states, 2013-2017. MMWR Morb Mortal Wkly Rep 2019;68:423-429. http://dx.doi.org/10.15585/mmwr.mm6818e1. Accessed February 16, 2023.

Piccardi C, Detollenaere J, Vanden Bussche P, Willems S. Social disparities in patient safety in primary care: a systematic review. Int J Equity Health. 2018 Aug 7;17(1):114. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6081855/. Accessed February 16, 2023.

Sanghavi P, Pan S, Caudry D. Assessment of nursing home reporting of major injury falls for quality measurement on Nursing Home Compare. Health Serv Res. 2020 Apr;55(2):201-210. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7080404/. Accessed February 16, 2023.

Schillinger D, Piette J, Grumbach K, Wang F, Wilson C, Daher C, Leong-Grotz K, Castro C, Bindman AB. Closing the loop: physician communication with diabetic patients who have low health literacy. Arch Intern Med. 2003 Jan 13;163(1):83-90. https://pubmed.ncbi.nlm.nih.gov/12523921/. Accessed February 16, 2023.

Seibert J, Barch D, Bernacet A, Kandilov A, Frank J, Free L, Roberts Q, Reilly K, McMullen T, Levitt A, Mandl S, Smith L. Examining social risk factors in a pressure ulcer quality measure for three post-acute care settings. Adv Skin Wound Care. 2020 Mar;33(3):156-163. https://pubmed.ncbi.nlm.nih.gov/31913859/. Accessed February 16, 2023.

Simmons S, Schnelle J, Slagle J, Sathe NA, Stevenson D, Carlo M, McPheeters ML. Resident Safety Practices in Nursing Home Settings. Technical Briefs, No. 24. Rockville, MD: Agency for Healthcare Research and Quality; May 2016. AHRQ Publication No. 16-EHC022-EF. https://www.ncbi.nlm.nih.gov/books/NBK384624/. Accessed February 16, 2023

Sobieraj DM, Coleman CI, Tongbram V, Chen W, Colby J, Lee S, Kluger J, Makanji S, Ashaye A, White CM. Comparative effectiveness of low-molecular-weight heparins versus other anticoagulants in major orthopedic surgery: a systematic review and meta-analysis. Pharmacotherapy. 2012 Sep;32(9):799-808.https://www.ncbi.nlm.nih.gov/pubmed/22744711. Accessed February 16, 2023.

Sunshine JE, Meo N, Kassebaum NJ, Collison ML, Mokdad AH, Naghavi M. Association of adverse effects of medical treatment with mortality in the United States: a secondary analysis of the Global Burden of Diseases, Injuries, and Risk Factors Study. JAMA Netw Open. 2019 Jan 4;2(1):e187041. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6484545/. Accessed February 16, 2023.

Thomas AD, Pandit C, Krevat SA. Race differences in reported harmful patient safety events in healthcare system high reliability organizations. J Patient Saf. 2020 Dec;16(4):e235-e239. https://pubmed.ncbi.nlm.nih.gov/30585888/. Accessed February 16, 2023.

Zhu J, Weingart SN, Ritter GA, Tompkins CP, Garnick DW. Racial/ethnic disparities in patient experience with communication in hospitals: real differences or measurement errors? Med Care. 2015 May;53(5):446-454. https://pubmed.ncbi.nlm.nih.gov/25856567/. Accessed February 16, 2023.

APPENDIX A: DATA METHODS AND ANALYSIS

Data Preparation

Metrics were aligned so that a lower rate is "better" (i.e., lower rate implies a healthier status). Measures were categorized by NHQDR dimension, NHQDR priority area, and setting. Reference groups were determined as noted below.

Variable	Reference Group
Age	18-44 years
Gender	Male
Race/Ethnicity	Non-Hispanic White
Income	400% or more of poverty guideline
Education	Any college education
Metropolitan status	Large fringe metropolitan (suburb) or metropolitan (urban)
Insurance	Any private insurance
Disability status	Adults without any disability

Methods: Trends

To determine quality, change of measure trends over time was assessed for at least four time points between 2000 and the most recent year. Meaningful differences between two groups were determined based on two criteria:

- Magnitude of change
- Statistical significance

Average annual percentage change was estimated using unweighted log-linear regression to be more consistent with Centers for Medicare & Medicaid Services methodology. This approach differs from previous chartbooks, which used weighted log-linear regression.

Interpretation of Trends

Measures are interpreted in three categories:

- **Improving** = Average annual percentage change >1% per year in a favorable direction and $p<0.10$.
- **Not Changing** = Average annual percentage change ≤1% per year or $p \geq 0.10$.
- **Worsening** = Average annual percentage change >1% per year in an unfavorable direction and $p<0.10$.

Measures that are not changing over time are not necessarily performing well. Each measure's performance requires further exploration of the data.

Methods: Size of Disparities

The NHQDR also assesses whether access or quality differs between two subpopulations for the most recent data year. Comparisons are typically made between a priority population group and a

reference group within a population characteristic (e.g., Black vs. White within the race characteristic). The best performing subgroup is typically used as the reference group.

Two criteria are applied to determine whether the difference between two groups is meaningful:

- The absolute difference between the priority population group and the reference group must be statistically significant with $p < 0.05$ on a two-tailed test.
- The relative difference between the priority population group and the reference group must be at least 10% when framed positively or negatively ($[p1 - p2]/p2 > 0.1$), where p1 is priority group's aligned rate and p2 is reference group's aligned rate.

Interpretation of Size of Disparities

Measures are interpreted in three categories:

- **Better** = Priority population estimate more favorable than reference group estimate by at least 10% and $p < 0.05$.
- **Same** = Priority population and reference group estimates differ by less than 10% or $p \geq 0.05$.
- **Worse** = Priority population estimate less favorable than reference group estimate by at least 10% and $p < 0.05$.

Measures that are performing the same do not necessarily indicate that those measures are performing well. Each measure's performance requires further exploration of the data.

Methods: Trends in Disparities Between Two Subpopulations

The NHQDR also observes whether the difference in access or quality between two subpopulations has changed over time. Meaningful differences between two groups are determined based on two criteria:

- Estimates for at least four time points between 2000 and the most recent data year for both the priority population and reference group are used to calculate the trend.
- **Model:** $M = \beta_0 + \beta_1 Y_1$ where M is the aligned rate of a subgroup, β_0 is the intercept or constant, and β_1 is the coefficient corresponding to year Y. The coefficient is the average annual change (AAC). We calculate the difference in the AAC and in the standard error values between the priority population group and reference group.
- We use standard errors from the regression coefficients to calculate the standard error of the absolute difference.

Interpretation of Trends in Disparities Between Two Subpopulations

Measures are interpreted in three categories:

- **Improving** = The difference in the AAC of the priority population and reference group is < -1 (in a favorable direction) and $p < 0.10$ for testing that regression coefficients are the same.
- **Not Changing** = Absolute value of the difference in the AAC of the priority population and reference group is <1 or the absolute value of the difference in the AAC of the priority population and reference group is >1 and $p \geq 0.10$ for testing that regression coefficients are the same.
- **Worsening** = The difference in the AAC of the priority population and reference group is >1 (in an unfavorable direction) and $p < 0.10$ for testing that regression coefficients are the same.

Measures that are not changing are not necessarily performing well. Each measure's performance requires further exploration of the data.

Methods and Interpretation: Calculating Benchmarks

The 2015 benchmark is calculated based on the average performance of the top 10% of states to encourage achievable goals. These standards are considered achievable because they have already been attained by the best performing states.

Five categories tell us about the direction of the measure compared with the benchmark:

- **Achieved** the benchmark or better: The rate in the most recent year is better than the benchmark value and changing in the desirable direction.
- **Approaching the benchmark:** The trend shows improvement toward the benchmark.
- **Insignificant change:** The average annual change is not statistically significant ($p \geq 0.05$) or the average annual change is zero.
- **No progress toward the benchmark:** Rate in the most recent year is worse than the benchmark and is changing in the undesirable direction.
- **Better than the benchmark** and **going away from the benchmark**: Rate in the most recent year is better than the benchmark, but the trend is showing worsening performance.

Publication No. 23-0032
March 2023
www.ahrq.gov