



Maternal Health Indicators (MHI) Benchmark Data Tables, v2024

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Introduction

The data presented in this document are nationwide comparative rates for Version 2024 of Agency for Healthcare Research and Quality (AHRQ) Quality Indicators (QI) Maternal Health Indicators (MHI) software. The numerators, denominators, and observed rates shown in this document are based on an analysis of discharge data from the 2019, 2020, and 2021 AHRQ Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID).¹

HCUP is a family of healthcare databases and related software tools and products developed through a Federal-State-Industry partnership. HCUP includes the largest collection of longitudinal hospital care data in the United States, with all-payer, encounter-level information beginning in 1988. The SID contains all-payer, encounter-level information on inpatient discharges, including clinical and resource information typically found on a billing record, such as patient demographics, up to 30 *International Classification of Diseases, Tenth Revision, Clinical Modification/Procedural Classification System (ICD-10-CM/PCS)* diagnoses and procedures, length of stay, expected payer, admission and discharge dates, and discharge disposition. In 2021, the HCUP databases represented more than 97 percent² of all annual discharges in the United States.

The analytic dataset used to generate the tables in this document consists of the same hospital discharge records that comprise the reference population for Version 2024 of the AHRQ QI software. This reference population file was limited to community hospitals and also excludes rehabilitation and long-term acute care (LTAC) hospitals. Information on the type of hospital was obtained by the American Hospital Association (AHA) Annual Survey of Hospitals. AHA defines community hospitals as “all non-Federal, short-term, general, and other specialty hospitals, excluding hospital units of institutions.” Included among community hospitals are specialty hospitals such as obstetrics-gynecology, ear-nose-throat, orthopedic, and pediatric institutions. Also included are public hospitals and academic medical centers.

There are indicators of the diagnoses being present on admission (POA) in the SID for 45 states in 2019, 46 states in 2020, and 45 states in 2021.³ Discharges from these participating States are used to develop the Maternal Health Indicators. Additional information on the reference population and the risk adjustment process may be found in Quality Indicator Empirical Methods, available on the AHRQ QI website (<http://www.qualityindicators.ahrq.gov/modules/Default.aspx>).

The QI observed rates for the Maternal Health Indicators and sub-indicators are scaled to the rate per 10,000 persons at risk. Cell sizes less than 11 are suppressed due to confidentiality; and are designated by an asterisk (*). When only one data point in a series must be suppressed due to cell sizes, another data point is provided as a range to disallow calculation of the masked variable.

¹ Healthcare Cost and Utilization Project (HCUP) 2019, 2020, and 2021 State Inpatient Databases (SID). Agency for Healthcare Research and Quality, Rockville, MD.

² Introduction to the HCUP State Inpatient Databases (SID). Healthcare Cost and Utilization Project (HCUP). June 2022. Agency for Healthcare Research and Quality, Rockville, MD. https://hcup-us.ahrq.gov/db/state/siddist/Introduction_to_SID.pdf.

³ States with data from 2019 included in the reference population for the hospital-level indicators are AK, AR, AZ, CA, CO, DC, FL, GA, HI, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, and WV. States with data from 2020 included in the reference population are the states with 2019 data plus WY. States with data from 2021 included in the reference population are AK, AR, AZ, CA, CO, DC, FL, GA, HI, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, and WV.

Acknowledgments

The AHRQ QI program would like to acknowledge the HCUP Partner organizations that participated in the HCUP SID and SEDD: **Alaska** Department of Health, **Arizona** Department of Health Services, **Arkansas** Department of Health, **California** Department of Health Care Access and Information, **Colorado** Hospital Association, **Connecticut** Hospital Association, **Delaware** Division of Public Health, **District of Columbia** Hospital Association, **Florida** Agency for Health Care Administration, **Georgia** Hospital Association, **Hawaii** Laulima Data Alliance , **Hawaii** University of Hawaii at Hilo, **Illinois** Department of Public Health, **Indiana** Hospital Association, **Iowa** Hospital Association, **Kansas** Hospital Association, **Kentucky** Cabinet for Health and Family Services, **Louisiana** Department of Health , **Maine** Health Data Organization, **Maryland** Health Services Cost Review Commission, **Massachusetts** Center for Health Information and Analysis, **Michigan** Health & Hospital Association, **Minnesota** Hospital Association, **Mississippi** State Department of Health, **Missouri** Hospital Industry Data Institute, **Montana** Hospital Association, **Nebraska** Hospital Association, **Nevada** Center for Health Information Analysis, **New Hampshire** Department of Health & Human Services, **New Jersey** Department of Health, **New Mexico** Department of Health, **New York** State Department of Health, **North Carolina** Department of Health and Human Services, **North Dakota** (data provided by the Minnesota Hospital Association), **Ohio** Hospital Association, **Oklahoma** State Department of Health, **Oregon** Apprise Health Insights, **Pennsylvania** Health Care Cost Containment Council, **Rhode Island** Department of Health, **South Carolina** Revenue and Fiscal Affairs Office, **South Dakota** Association of Healthcare Organizations, **Tennessee** Hospital Association, **Texas** Department of State Health Services, **Utah** Department of Health, **Vermont** Association of Hospitals and Health Systems, **Virginia** Health Information, **Washington** State Department of Health, **West Virginia** Department of Health and Human Resources, **Wisconsin** Department of Health Services, and **Wyoming** Hospital Association.

MHI Benchmark Tables

Table 1. Maternal Health Indicators (MHI) for Overall Population: Area-Level Indicators

| INDICATOR | LABEL | NUMERATOR | DENOMINATOR | OBSERVED RATE PER 10,000 DISCHARGES |
|---------------|---|-----------|-------------|--|
| MHI 01 | Severe Maternal Morbidity Rate (20 Indicators) | 33,485 | 3,330,103 | 100.55 |
| MHI 02 | Severe Maternal Morbidity (20 Indicators) Plus In-Hospital Mortality Rate | 33,498 | 3,330,103 | 100.59 |
| MHI 03 | Refined Severe Maternal Morbidity (20 Indicators) Plus In-Hospital Mortality Rate, Beta | 24,182 | 3,330,103 | 72.62 |
| myocard | Acute Myocardial Infarction Rate | 277 | 3,330,103 | 0.83 |
| aneurysm | Aneurysm Rate | 129 | 3,330,103 | 0.39 |
| acute_renal | Acute Renal Failure Rate | 7,387 | 3,330,103 | 22.18 |
| resp_distress | Adult Respiratory Distress Syndrome Rate | 7,321 | 3,330,103 | 21.98 |
| am_fluid | Amniotic Fluid Embolism Rate | 198 | 3,330,103 | 0.59 |
| card_arr | Cardiac Arrest/Ventricular Fibrillation Rate | 490 | 3,330,103 | 1.47 |
| conv_card | Conversion of Cardiac Rhythm Rate | 413 | 3,330,103 | 1.24 |
| diss_intra | Disseminated Intravascular Coagulation Rate | 8,151 | 3,330,103 | 24.48 |
| eclampsia | Eclampsia Rate | 2,463 | 3,330,103 | 7.40 |
| heart_fail | Heart Failure/Arrest during Surgery or Procedure Rate | 48 | 3,330,103 | 0.14 |
| puerp | Puerperal Cerebrovascular Disorder Rate | 1,458 | 3,330,103 | 4.38 |
| pulm_ed | Pulmonary Edema/Acute Heart Failure Rate | 2,661 | 3,330,103 | 7.99 |

AHRQ Quality Indicators
Maternal Health Indicators (MHI) Benchmark Data Tables, v2024

| INDICATOR | LABEL | NUMERATOR | DENOMINATOR | OBSERVED RATE PER 10,000 DISCHARGES |
|---------------|--|-----------|-------------|--|
| anes_comp | Severe Anesthesia Complications Rate | 218 | 3,330,103 | 0.65 |
| sepsis | Sepsis Rate | 5,103 | 3,330,103 | 15.32 |
| shock | Shock Rate | 3,003 | 3,330,103 | 9.02 |
| sickle | Sickle Cell Disease with Crisis Rate | 444 | 3,330,103 | 1.33 |
| air_thromb | Air and Thrombotic Embolism Rate | 1,287 | 3,330,103 | 3.86 |
| hyster | Hysterectomy Rate | 4,259 | 3,330,103 | 12.79 |
| tracheo | Temporary Tracheostomy Rate | 288 | 3,330,103 | 0.86 |
| vent | Ventilation Rate | 2,868 | 3,330,103 | 8.61 |
| deceased_flag | In-Hospital Mortality Rate | 456 | 3,330,103 | 1.37 |
| acute_renal3 | Refined Acute Renal Failure Rate | 222 | 3,330,103 | 0.67 |
| diss_intra3 | Refined Disseminated Intravascular Coagulation Rate | 2,701 | 3,330,103 | 8.11 |

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Table 2. MHI 01- Severe Maternal Morbidity Rate (20 Indicators)

| GROUP | NUMERATOR | DENOMINATOR | OBSERVED RATE PER 10,000 DISCHARGES |
|--------------------------|-----------|-------------|--|
| Overall | 33,485 | 3,330,103 | 100.55 |
| White | 13,965 | 1,681,303 | 83.06 |
| Black | 7,289 | 468,285 | 155.65 |
| Hispanic | 7,181 | 712,858 | 100.74 |
| Asian and NH/PI | 2,190 | 190,713 | 114.83 |
| Other | 2,860 | 276,944 | 103.27 |
| County Poverty Decile 1 | 2,974 | 330,519 | 89.98 |
| County Poverty Decile 2 | 2,831 | 313,111 | 90.42 |
| County Poverty Decile 3 | 3,200 | 321,263 | 99.61 |
| County Poverty Decile 4 | 3,044 | 331,642 | 91.79 |
| County Poverty Decile 5 | 3,169 | 320,582 | 98.85 |
| County Poverty Decile 6 | 3,408 | 318,644 | 106.95 |
| County Poverty Decile 7 | 3,686 | 352,042 | 104.7 |
| County Poverty Decile 8 | 3,426 | 329,676 | 103.92 |
| County Poverty Decile 9 | 3,629 | 348,301 | 104.19 |
| County Poverty Decile 10 | 4,018 | 358,713 | 112.01 |
| AK | 92 | 6,836 | 134.58 |
| AR | 271 | 34,176 | 79.3 |
| AZ | 787 | 75,011 | 104.92 |
| CA | 4,490 | 402,564 | 111.54 |
| CO | 635 | 58,961 | 107.7 |
| DC | 145 | 11,840 | 122.47 |
| FL | 2,345 | 203,296 | 115.35 |
| GA | 1,257 | 116,217 | 108.16 |
| HI | 137 | 12,960 | 105.71 |
| IA | 276 | 35,429 | 77.9 |
| IL | 1,112 | 123,837 | 89.8 |
| IN | 735 | 75,216 | 97.72 |
| KS | 238 | 33,115 | 71.87 |
| KY | 454 | 47,607 | 95.36 |
| LA | 470 | 55,041 | 85.39 |
| MA | 797 | 67,978 | 117.24 |
| MD | 610 | 62,267 | 97.97 |
| ME | 79 | 11,123 | 71.02 |

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Maternal Health Indicators (MHI) Benchmark Data Tables, v2024

| GROUP | NUMERATOR | DENOMINATOR | OBSERVED RATE PER 10,000 DISCHARGES |
|--------------------------------|-----------|-------------|--|
| MI | 994 | 97,692 | 101.75 |
| MN | 682 | 60,621 | 112.5 |
| MO | 725 | 66,834 | 108.48 |
| MS | 301 | 33,082 | 90.99 |
| MT | 74 | 10,195 | 72.58 |
| NC | 1,162 | 114,551 | 101.44 |
| ND | 68 | 10,498 | 64.77 |
| NE | 134 | 22,349 | 59.96 |
| NH | 107 | 11,922 | 89.75 |
| NJ | 826 | 95,041 | 86.91 |
| NM | 184 | 18,358 | 100.23 |
| NV | 313 | 30,249 | 103.47 |
| NY | 2,350 | 195,803 | 120.02 |
| OH | 1,196 | 125,126 | 95.58 |
| OK | 374 | 42,867 | 87.25 |
| OR | 359 | 38,935 | 92.2 |
| PA | 1,360 | 123,564 | 110.06 |
| RI | 125 | 10,734 | 116.45 |
| SC | 499 | 51,610 | 96.69 |
| SD | 50 | 8,575 | 58.31 |
| TN | 849 | 82,803 | 102.53 |
| TX | 3,328 | 356,876 | 93.25 |
| UT | 336 | 44,335 | 75.79 |
| VA | 709 | 87,866 | 80.69 |
| VT | 36 | 4,367 | 82.44 |
| WA | 778 | 76,347 | 101.9 |
| WI | 446 | 57,833 | 77.12 |
| WV | 190 | 17,596 | 107.98 |
| Private | 15,753 | 1,779,528 | 88.52 |
| Medicare | 545 | 19,188 | 284.03 |
| Medicaid | 15,413 | 1,349,938 | 114.18 |
| Other | 949 | 96,092 | 98.76 |
| Uninsured (self-pay/no charge) | 825 | 85,357 | 96.65 |

Table 3. MHI 02- Severe Maternal Morbidity (20 Indicators) Plus In-Hospital Mortality Rate

| GROUP | NUMERATOR | DENOMINATOR | OBSERVED RATE PER 10,000 DISCHARGES |
|--------------------------|-----------|-------------|--|
| Overall | 33,498 | 3,330,103 | 100.59 |
| White | 13,971 | 1,681,303 | 83.1 |
| Black | 7,291 | 468,285 | 155.7 |
| Hispanic | 7,183 | 712,858 | 100.76 |
| Asian and NH/PI | 2,191 | 190,713 | 114.88 |
| Other | 2,862 | 276,944 | 103.34 |
| County Poverty Decile 1 | 2,974 | 330,519 | 89.98 |
| County Poverty Decile 2 | 2,832 | 313,111 | 90.45 |
| County Poverty Decile 3 | 3,200 | 321,263 | 99.61 |
| County Poverty Decile 4 | 3,044 | 331,642 | 91.79 |
| County Poverty Decile 5 | 3,170 | 320,582 | 98.88 |
| County Poverty Decile 6 | 3,409 | 318,644 | 106.98 |
| County Poverty Decile 7 | 3,688 | 352,042 | 104.76 |
| County Poverty Decile 8 | 3,428 | 329,676 | 103.98 |
| County Poverty Decile 9 | 3,631 | 348,301 | 104.25 |
| County Poverty Decile 10 | 4,022 | 358,713 | 112.12 |
| AK | 92 | 6,836 | 134.58 |
| AR | 271 | 34,176 | 79.3 |
| AZ | 788 | 75,011 | 105.05 |
| CA | 4,490 | 402,564 | 111.54 |
| CO | 635 | 58,961 | 107.7 |
| DC | 145 | 11,840 | 122.47 |
| FL | 2,347 | 203,296 | 115.45 |
| GA | 1,257 | 116,217 | 108.16 |
| HI | 137 | 12,960 | 105.71 |
| IA | 276 | 35,429 | 77.9 |
| IL | 1,113 | 123,837 | 89.88 |
| IN | 735 | 75,216 | 97.72 |
| KS | 238 | 33,115 | 71.87 |
| KY | 454 | 47,607 | 95.36 |
| LA | 470 | 55,041 | 85.39 |
| MA | 797 | 67,978 | 117.24 |
| MD | 610 | 62,267 | 97.97 |
| ME | 79 | 11,123 | 71.02 |

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| GROUP | NUMERATOR | DENOMINATOR | OBSERVED RATE PER 10,000 DISCHARGES |
|--------------------------------|-----------|-------------|--|
| MI | 994 | 97,692 | 101.75 |
| MN | 682 | 60,621 | 112.5 |
| MO | 725 | 66,834 | 108.48 |
| MS | 301 | 33,082 | 90.99 |
| MT | 74 | 10,195 | 72.58 |
| NC | 1,162 | 114,551 | 101.44 |
| ND | 69 | 10,498 | 65.73 |
| NE | 134 | 22,349 | 59.96 |
| NH | 107 | 11,922 | 89.75 |
| NJ | 826 | 95,041 | 86.91 |
| NM | 185 | 18,358 | 100.77 |
| NV | 313 | 30,249 | 103.47 |
| NY | 2,352 | 195,803 | 120.12 |
| OH | 1,196 | 125,126 | 95.58 |
| OK | 374 | 42,867 | 87.25 |
| OR | 361 | 38,935 | 92.72 |
| PA | 1,360 | 123,564 | 110.06 |
| RI | 125 | 10,734 | 116.45 |
| SC | 499 | 51,610 | 96.69 |
| SD | 50 | 8,575 | 58.31 |
| TN | 849 | 82,803 | 102.53 |
| TX | 3,330 | 356,876 | 93.31 |
| UT | 336 | 44,335 | 75.79 |
| VA | 709 | 87,866 | 80.69 |
| VT | 36 | 4,367 | 82.44 |
| WA | 778 | 76,347 | 101.9 |
| WI | 446 | 57,833 | 77.12 |
| WV | 191 | 17,596 | 108.55 |
| Private | 15,759 | 1,779,528 | 88.56 |
| Medicare | 545 | 19,188 | 284.03 |
| Medicaid | 15,418 | 1,349,938 | 114.21 |
| Other | 951 | 96,092 | 98.97 |
| Uninsured (self-pay/no charge) | 825 | 85,357 | 96.65 |

Table 4. MHI 03- Refined Severe Maternal Morbidity (20 Indicators) Plus In-Hospital Mortality Rate, Beta

| GROUP | NUMERATOR | DENOMINATOR | OBSERVED RATE PER 10,000 DISCHARGES |
|--------------------------|-----------|-------------|--|
| Overall | 24,182 | 3,330,103 | 72.62 |
| White | 9,940 | 1,681,303 | 59.12 |
| Black | 5,301 | 468,285 | 113.2 |
| Hispanic | 5,280 | 712,858 | 74.07 |
| Asian and NH/PI | 1,552 | 190,713 | 81.38 |
| Other | 2,109 | 276,944 | 76.15 |
| County Poverty Decile 1 | 2,088 | 330,519 | 63.17 |
| County Poverty Decile 2 | 1,987 | 313,111 | 63.46 |
| County Poverty Decile 3 | 2,322 | 321,263 | 72.28 |
| County Poverty Decile 4 | 2,240 | 331,642 | 67.54 |
| County Poverty Decile 5 | 2,325 | 320,582 | 72.52 |
| County Poverty Decile 6 | 2,511 | 318,644 | 78.8 |
| County Poverty Decile 7 | 2,540 | 352,042 | 72.15 |
| County Poverty Decile 8 | 2,620 | 329,676 | 79.47 |
| County Poverty Decile 9 | 2,633 | 348,301 | 75.6 |
| County Poverty Decile 10 | 2,836 | 358,713 | 79.06 |
| AK | 64 | 6,836 | 93.62 |
| AR | 220 | 34,176 | 64.37 |
| AZ | 640 | 75,011 | 85.32 |
| CA | 3,180 | 402,564 | 78.99 |
| CO | 471 | 58,961 | 79.88 |
| DC | 98 | 11,840 | 82.77 |
| FL | 1,831 | 203,296 | 90.07 |
| GA | 960 | 116,217 | 82.6 |
| HI | 89 | 12,960 | 68.67 |
| IA | 203 | 35,429 | 57.3 |
| IL | 747 | 123,837 | 60.32 |
| IN | 539 | 75,216 | 71.66 |
| KS | 183 | 33,115 | 55.26 |
| KY | 348 | 47,607 | 73.1 |
| LA | 349 | 55,041 | 63.41 |
| MA | 436 | 67,978 | 64.14 |
| MD | 426 | 62,267 | 68.42 |

AHRQ Quality Indicators
Maternal Health Indicators (MHI) Benchmark Data Tables, v2024

| GROUP | NUMERATOR | DENOMINATOR | OBSERVED RATE PER 10,000 DISCHARGES |
|--------------------------------|-----------|-------------|--|
| ME | 53 | 11,123 | 47.65 |
| MI | 730 | 97,692 | 74.72 |
| MN | 513 | 60,621 | 84.62 |
| MO | 542 | 66,834 | 81.1 |
| MS | 231 | 33,082 | 69.83 |
| MT | 62 | 10,195 | 60.81 |
| NC | 840 | 114,551 | 73.33 |
| ND | 56 | 10,498 | 53.34 |
| NE | 105 | 22,349 | 46.98 |
| NH | 84 | 11,922 | 70.46 |
| NJ | 519 | 95,041 | 54.61 |
| NM | 131 | 18,358 | 71.36 |
| NV | 257 | 30,249 | 84.96 |
| NY | 1,388 | 195,803 | 70.89 |
| OH | 827 | 125,126 | 66.09 |
| OK | 301 | 42,867 | 70.22 |
| OR | 255 | 38,935 | 65.49 |
| PA | 883 | 123,564 | 71.46 |
| RI | 75 | 10,734 | 69.87 |
| SC | 388 | 51,610 | 75.18 |
| SD | 36 | 8,575 | 41.98 |
| TN | 638 | 82,803 | 77.05 |
| TX | 2,629 | 356,876 | 73.67 |
| UT | 268 | 44,335 | 60.45 |
| VA | 551 | 87,866 | 62.71 |
| VT | 25 | 4,367 | 57.25 |
| WA | 546 | 76,347 | 71.52 |
| WI | 319 | 57,833 | 55.16 |
| WV | 146 | 17,596 | 82.97 |
| Private | 10,853 | 1,779,528 | 60.99 |
| Medicare | 418 | 19,188 | 217.84 |
| Medicaid | 11,611 | 1,349,938 | 86.01 |
| Other | 668 | 96,092 | 69.52 |
| Uninsured (self-pay/no charge) | 632 | 85,357 | 74.04 |