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Minnesota's mental health crisis: Our methodology

How the Star Tribune selected and calculated payment rates using newly available data.

By Christopher Snowbeck (<https://www.startribune.com/christopher-snowbeck/6370570/>) Star Tribune

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Newly released data made it possible to take a look at the financial side of mental health care and how that is likely limiting the availability of services.

The Star Tribune [analyzed hospital payment data](https://www.startribune.com/minnesota-mental-health-care-crisis-bed-shortage-low-reimbursement/600258431/) (<https://www.startribune.com/minnesota-mental-health-care-crisis-bed-shortage-low-reimbursement/600258431/>) recently posted to comply with [federal regulations](https://www.cms.gov/healthplan-price-transparency) (<https://www.cms.gov/healthplan-price-transparency>). The goal of the regulations is to increase consumer price transparency, but the first phase requires hospitals to release their data in a machine-readable format that's not often used or accessed by people. We turned to [Turquoise Health](https://turquoise.health/) (<https://turquoise.health/>), a San Diego-based company that collects and standardizes the information, to help us streamline our analysis.

To make comparisons, the Star Tribune selected common categories of care based on federal discharge data for Minnesota in 2017 — the most recent year available. The federal government [uses these categories](https://www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/ms-drg-classifications-and-software#:~:text=Currently%2C%20cases%20are%20classified%20into,procedures%20performed%20during%20the%20stay,) (<https://www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/ms-drg-classifications-and-software#:~:text=Currently%2C%20cases%20are%20classified%20into,procedures%20performed%20during%20the%20stay,>) to classify a hospital patient's case for making Medicare payment decisions. Many private health insurers use this payment methodology as well.

Out of more than 700 categories of care, the Star Tribune selected the 20 most common, excluding those related to childbirth.

The analysis calculated median payments from more than two dozen health plans across 88 hospitals in the state — a group that includes hospitals in the Allina, CentraCare, Essentia Health, M Health Fairview, Mayo and Sanford health systems.

Median payments were adjusted by average length of stay. Rates for commercial, Medicaid and Medicare Advantage health plans were compared to Medicare reference prices calculated by Turquoise Health.

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Childbirth categories were excluded because Medicare doesn't pay for many deliveries, so researchers question whether Medicare pricing provides a meaningful reference.

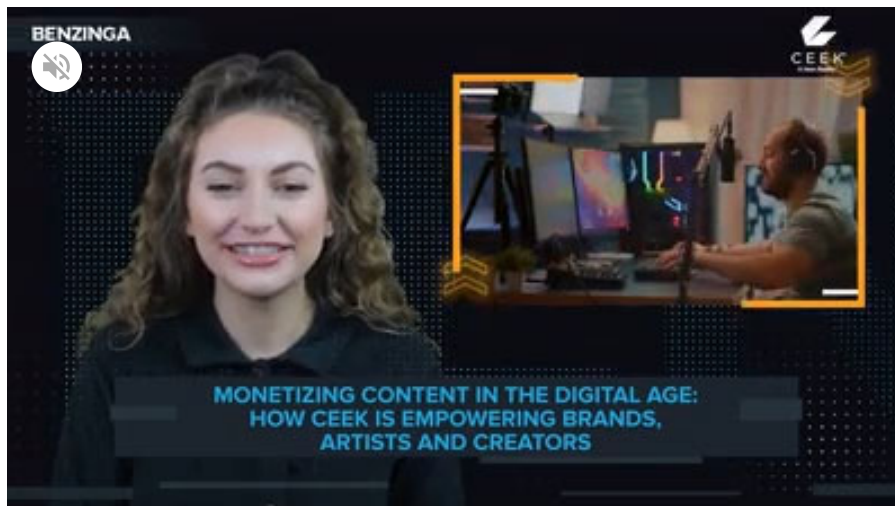
The 700-plus categories of care are known as Medicare Severity Diagnosis Related Groups. While there are other payment methodologies with their own diagnosis-based codes, these MS-DRG codes appear to be the most common type when hospitals bill insurers for inpatient care, said Morgan Henderson, principal data scientist at the Hilltop Institute of the University of Maryland, Baltimore County.

Henderson has conducted research on payment data (<https://www.healthaffairs.org/doi/10.1377/forefront.20211103.716124/full/>) posted by hospitals across the country. Initial reporting by hospitals in Minnesota (<https://www.startribune.com/u-of-m-study-shows-hospitals-slow-to-post-price-transparency-data/600071245/>) and other states (<https://www.kff.org/health-costs/issue-brief/ongoing-challenges-with-hospital-price-transparency/>) has been criticized for being incomplete and inconsistent, but the Centers for Medicare and Medicaid Services (CMS) says the quality has improved considerably (<https://www.healthaffairs.org/content/forefront/hospital-price-transparency-progress-and-commitment-achieving-its-potential>).

Each machine-readable file posted by a hospital has thousands of line items. The file posted last year by University of Minnesota Medical Center, for example, had about 34,000 lines of data including codes for three major types of reimbursement: hospital service codes; codes for services by health care professionals; and codes for supplies used in care.

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The Star Tribune focused on a small subset of the first group — payment rates for hospital services. The newspaper selected the 20 most common non-pregnancy MS-DRGs in Minnesota based on federal data (<https://hcupnet.ahrq.gov/#setup>) from the federal Agency for Healthcare Research and Quality (AHRQ).

The 20 categories covered about 27% of all hospital discharges in Minnesota during 2017, the most recent year available when the Star Tribune began its research.

In March, the newspaper checked Minnesota Hospital Association (MHA) data and found that 15 of the 20 MS-DRGs were also in the top 20 during 2021; the other five categories continued to rank in the top 10% of all MS-DRG codes.

The Star Tribune exported data from Turquoise Health in the fourth quarter of 2022 and again in the first quarter of 2023 and found very similar results across the time periods. Small changes are expected as Turquoise Health continually updates its database.

The figures published here reflect medians calculated from a data export in February 2023.

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There are different calculations for average length of stay (LOS). The Star Tribune consulted billing experts and researchers before selecting the arithmetic mean length of stay (<https://www.cms.gov/medicare/acute-inpatient-pps/fy-2022-ipp-pps-final-rule-home-page#MIF>) as reported for 2022 by CMS to calculate per-day payment rates.

While there are arguments for using the geometric mean length-of-stay from CMS or LOS calculations from AHRQ (2017) or MHA (2021), most experts supported using the CMS arithmetic mean. For psychoses patients, the CMS arithmetic mean LOS (8.8 days) is longer than the agency's geometric mean LOS calculation (5.9 days); it's also shorter than the LOS calculations from AHRQ (9.7 days) and MHA (10 days). So, the figure chosen by the Star Tribune is neither the highest nor the lowest available.

Turquoise Health calculates a Medicare reference price for all MS-DRGs. To see how commercial, Medicaid and Medicare Advantage health plan payments for psychoses patients compared to payments for other patient groups, the Star Tribune calculated ratios for each of the 20 MS-DRGs.

At the median, commercial health plans paid between 168% and 194% of the Medicare reference price depending on the category. For psychoses, commercial plans paid 176% of the Medicare price.

Medicaid health plans paid between 103% and 122% of the Medicare reference price depending on the category. For psychoses, they paid 113% of the Medicare price.

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Across all four payer classes — commercial, Medicaid, Medicare Advantage and Medicare reference — the per-day median payment for psychoses was lower than for all other categories of care.

Data from Turquoise Health includes rates for outlier cases, which compensate hospitals for cases that require hospitals to use more resources. The published figures from the Star Tribune include the outlier rates. Excluding the outlier rates changed medians only modestly — from 0% to -3.2% depending on the MS-DRG.

These are the 20 MS-DRGs in the Star Tribune analysis:

- 65: INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION WITH CC OR TPA IN 24 HOURS
- 101: SEIZURES WITHOUT MCC
- 189: PULMONARY EDEMA AND RESPIRATORY FAILURE
- 190: CHRONIC OBSTRUCTIVE PULMONARY DISEASE WITH MCC
- 193: SIMPLE PNEUMONIA AND PLEURISY WITH MCC
- 194: SIMPLE PNEUMONIA AND PLEURISY WITH CC
- 247: PERCUTANEOUS CARDIOVASCULAR PROCEDURES WITH DRUG-ELUTING STENT WITHOUT MCC
- 291: HEART FAILURE AND SHOCK WITH MCC
- 330: MAJOR SMALL AND LARGE BOWEL PROCEDURES WITH CC
- 378: GASTROINTESTINAL HEMORRHAGE WITH CC
- 392: ESOPHAGITIS, GASTROENTERITIS AND MISCELLANEOUS DIGESTIVE DISORDERS WITHOUT MCC
- 470: MAJOR HIP AND KNEE JOINT REPLACEMENT OR REATTACHMENT OF LOWER EXTREMITY WITHOUT MCC
- 603: CELLULITIS WITHOUT MCC
- 641: MISCELLANEOUS DISORDERS OF NUTRITION, METABOLISM, FLUIDS AND ELECTROLYTES WITHOUT MCC
- 683: RENAL FAILURE WITH CC
- 690: KIDNEY AND URINARY TRACT INFECTIONS WITHOUT MCC
- 871: SEPTICEMIA OR SEVERE SEPSIS WITHOUT MV >96 HOURS WITH MCC
- 872: SEPTICEMIA OR SEVERE SEPSIS WITHOUT MV >96 HOURS WITHOUT MCC
- 885: PSYCHOSES
- 897: ALCOHOL, DRUG ABUSE OR DEPENDENCE WITHOUT REHABILITATION THERAPY WITHOUT MCC

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Christopher Snowbeck covers health insurers, including Minnetonka-based UnitedHealth Group, and the business of running hospitals and clinics.

chris.snowbeck@startribune.com [ChrisSnowbeck](#)

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