COLORADO
Department of Health Care Policy & Financing

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Payment Variation Tool Methodology

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Contents

Introduction

Health Management Associates (HMA) was requested by the Colorado Department of Health Care Policy and Financing (HCPF) to perform an analysis of acute care hospital payment variation. The purpose of this analysis is to provide HCPF with a resource on inpatient hospital payments, measure variation, and offer insights to HCPF on how this information may be used to help meet the Department's policy objectives.

Studies have shown that the price of medical services is a key factor that drives health care spending disparities. One 2018 study concluded that price is a more important factor than utilization, population health and social spending in explaining why the US spends so much more on health care than other high-income countries. [1]

The health care delivery system in Colorado, as in nearly all states, is complicated and fragmented with many public and private payer sources. Pricing for hospital and other health care services varies significantly from payer to payer, and a given payer may pay significantly more to some providers than others for the same service, on the same day for the same type of patient. Variation in payment rates may be beneficial if it rewards high quality care or recognizes appropriate differences in the underlying cost of care. However, past research has shown that factors such as provider size and prestige may have more impact on pricing than quality or other measures of value to the purchaser.[2]

HCPF has a key role and multiple responsibilities in the state's efforts to improve the cost trend in Colorado. One of the primary areas of emphasis has been to assess hospital financial performance and, specifically, to quantify and analyze the higher rates that hospitals receive from commercial insurers compared to below-cost payments from public payers. The focus of these comparisons of private to public payer prices paid to hospitals has been on the aggregate difference between commercial insurance, Medicare, and Medicaid. This analysis provides HCPF with comprehensive data about differences across several dimensions including variation by hospital, payer, and Diagnostic Related Group (DRG).

The primary source of data was the Colorado All-Payer Claims Database (APCD) which is managed by the Center for Improving Value in Health Care (CIVHC). HMA received from CIVHC an extract of inpatient acute care discharges and performed several calculations to address differences in acuity and severity and to include supplemental payments that are not made at the claim level. HMA also developed measures to quantify the effect of payment variation. The results of the analysis were presented to HCPF in a Tableau workbook on March 29, 2023. This document accompanies the Tableau workbook, providing:

- A summarized and detailed description of the methodology
- Findings about data quality and completeness
- Definitions and examples of payment variation measures

[1] I. Papanicolas, L. R. Woskie, and A. K. Jha, "Health Care Spending in the United States and Other High-Income Countries," Journal of the American Medical Association, March 13, 2018 319(10):1024–39

[2] Examples: Chapin, White and Bond, "Understanding Differences Between High- And Low-Price Hospitals: Implications for Efforts to Rein in Costs", Health Affairs February 2014; Gorman Actuarial, for the New York State Health Foundation, "Why Are Hospital Prices Different? An Examination of New York Hospital Reimbursement", December 2016; and Xerox Corporation, "Variation in Payment for Hospital Care in Rhode Island", December 2012.

- Overview of Tableau workbook and description of each worksheet
- Possible future enhancements to the analysis

Data Used

Claims Defined

HMA requested and received from CIVHC an extract of inpatient hospital claims from the APCD for 2017-2021 discharges. Key specifications for determining which claims to include in the extract are as follows:

- Short term acute care hospitals (Medicare ID between 06-0001 and 06-1399 plus children's hospitals)
- Discharges from January 1, 2017, to December 31, 2021
- Final primary insurance claims: CIVHC developed logic to exclude interim and secondary payer claims

Several fields were extracted for each claim. The most important fields used in the analysis are:

- Hospital name and ID
- Line of business - commercial, Medicaid, Medicare, Medicare Advantage
- Payer alias - CIVHC blinded the health plan name but created a "payer alias number" to enable analysis of payments and payment variation within a given health plan
- DRG assignments – All Payer Refined Diagnostic Related Group (APRDRG) and Medicare's MS-DRG
- Date of discharge
- Total allowed amount – the base amount paid to the hospital from all sources (primary and secondary insurance, and patient responsibility); the allowed amount assumes that the secondary insurance and patient pay portions were paid in full.

Quality Assurance Work

CIVHC performed extensive quality assurance review procedures before sending the file to HMA, and HMA performed numerous tests and analyses of the data. CIVHC and HMA made several adjustments to address concerns with the data and identified additional data concerns that have not been resolved. The following summarizes the adjustments to the dataset and the unresolved concerns.

Adjustments to the Extract Made by CIVHC

A significant amount of work was performed by CIVHC prior to delivering the dataset to HMA. CIVHC removed or combined over 112,519 records (about 8% of the total extracted records) because of its efforts. The most significant adjustments made by CIVHC were as follows:

- Duplicate Medicaid claims, submitted by both HCPF and the MCO/RAE (27,240 claims)
- Interim claims and claim adjustments (45,602 claims)
- Claims with bill type codes other than final (26,540 claims)
- Multiple claims for the same hospital stay (13,137 claims)

Adjustments Resulting from HMA Review

Zero ($0) Payment and Very low Payment

There were 22,457 claims with $0 payment and 5,466 claims with very low payment were flagged. The $0 payment and very low payment claims may represent denials by the payer, claim adjustments or errors in data submitted to the APCD. Each of these claims was removed from the dataset.

Missing or Invalid DRG

HMA identified 18,125 claims with a missing or invalid APRDRG, MS-DRG or both. Where a valid DRG was available in one system but not the other, HMA estimated the relative weight for the invalid DRG using the available weight. However, 2,152 claims did not have a valid APRDRG or MS-DRG and were removed.

Missing Line of Business

There were 924 claims with no line of business. In most cases, HMA used available information to determine the line of business. In 200 instances, line of business could not be determined, and the claims were removed.

Multiple Claims for the Same Discharge

HMA identified several claims with the same discharge as another claim in the dataset, based on the combination of member ID, hospital, and discharge date. In most of these instances, the two claims represented a delivery and newborn (one discharge for the mother, one for the baby); the review resulted in removing 679 claims that appeared to be duplicates.

Psychiatric, Substance Abuse Claims

The focus of the payment variation analysis is on acute care services. Accordingly, claims with a psychiatric or substance abuse DRG were removed from the dataset.

Low Volume Hospitals

Several hospitals have very low inpatient volume, most of which are critical access hospitals. HCPF requested that critical access hospitals be included. Two non-critical access hospitals have very low volume in the 2023 dataset, and one of the two is no longer an acute care hospital. The claims for these two hospitals were removed.

Other Concerns with the Data

HMA identified other concerns with the dataset, which did not result in adjustments but could affect the accuracy and completeness of the discharge data.

Discharge Counts Compared to Cost Reports

Large differences exist between the APCD report and the amounts reported by the hospitals in their Medicare cost reports. In addition, HMA identified several individual hospitals with unusually large variances for one or more payers. Explanations exist for a significant part of the variances, but there is uncertainty about whether the dataset is complete. Some of this may also be attributed to the dropped SUD claims from the final APCD dataset.

Medicare Charges

Medicare charges in the APCD are significantly higher than the charges reported by hospitals in their Medicare cost reports. HMA compared the totals by hospital for 2020 and for most

hospitals, the Medicare charges in the APCD extract are approximately double the cost report charges.

Medicare Payments
As explained below, one computation of price variation compares commercial and Medicaid payments to what Medicare would pay. HMA accessed Medicare public use files to estimate "what Medicare would pay" for each claim based on the hospital and the claim's MS-DRG assignment and charges. HMA also estimated the Medicare payment for the Medicare claims in the file and compared the estimate to the payment derived from the APCD.

Conclusion
Greater emphasis on resolving or minimizing the types of issues identified here is warranted. An extensive amount of quality review and revisions were necessary to eliminate or address errors, and the potential for remaining issues creates uncertainty about the accuracy and completeness of the inpatient claims data.

Methodologies and Calculations

Relative Price Methods
The primary metric for quantifying payment variation is referred to as **"relative price",** the ratio derived from comparing the payment on a claim to a benchmark amount. Two distinct methods of calculating relative price are used.

Average price method: The amount paid for a claim is compared to the average amount paid for all claims. As explained below, under the average price method payments are adjusted by the APRDRG relative weight (casemix), intended to standardize payment for differences in acuity and severity.

Under the average price method, the benchmark is the casemix-adjusted average payment for all claims across all payers in a given year. To calculate the benchmark, HMA computed the casemix-adjusted payment for every claim in the dataset (see Casemix Adjustment section below), summed the values by year, and divided the sum by the total claim count by year.

The relative price for each claim under the average price method is expressed as a ratio:

$$\frac{\text{casemix-adjusted amount paid on the claim}}{\text{average casemix-adjusted payment for all claims during the year}}$$

Medicare-equivalent method: The amount paid for a claim is compared to what Medicare would pay for the claim. The amount that Medicare would pay for a claim is often used as a benchmark for pricing comparisons because Medicare is a dominant payer that sets prices administratively (rather than negotiating).

Under the Medicare-equivalent method, the benchmark is an estimate of what Medicare would pay for each claim in the dataset. Medicare inpatient payment methodologies are complex. There are 18 different factors used by HMA in the inpatient payment estimate for general acute care hospitals, and different methods are used for critical access and children's hospitals. HMA developed hospital-specific rates for each of the federal fiscal years within the CY 2017- CY 2021

period to estimate the Medicare-equivalent payments. See Appendix C for additional information.

The relative price for each claim under the Medicare—equivalent method is expressed as a ratio:

$$\frac{\text{amount paid on the claim}}{\text{estimate of what Medicare would have paid for the claim}}$$

An example of the two methods follows. Assume a hospital is paid $50,000 for a commercial claim, with a 1.50 APRDRG relative weight, and that the benchmarks are $16,000 for the average casemix-adjusted payment for all claims, and $20,000 for the amount that Medicare would pay for the claim.

	Average Price Method	Medicare-equiv. Method
Amount paid on a claim	$50,000	$50,000
APRDRG relative weight	1.50	N/A
Adjusted payment (A)	$33,333	$50,000
Benchmark (B)	$16,000	$20,000
Relative price ratio (A / B)	2.08	2.50

Casemix Adjustment – Average Price Method

There is enormous range of resources required to care for hospital inpatients. Care for a healthy newborn for 1-2 days following delivery requires relatively minimal nursing and other resources. However, a low birth-weight premature newborn with major respiratory or cardiac conditions may require multiple surgeries and weeks of intensive life support, costing 300 times more than a healthy newborn.

DRG models are used to measure these resource and cost differences, and the most commonly used DRG model by states is the All Payer Refined Diagnostic Related Group (APRDRG) model developed and maintained by the 3M Company. Under APRDRG, every inpatient discharge is assigned to a DRG and is assigned a severity level (1-4) based on ICD-10 diagnosis and procedure codes. Each combination of DRG and severity level is given a relative weight, a measure of the relative cost of inpatient care. For example, a healthy newborn with severity level 1 and a high-risk premature newborn requiring ECMO level 4 have relative weights of 0.10 and 32.5, respectively.

APRDRG is used in Colorado and many other states to establish Medicaid payments for inpatient services, and many commercial payers use APRDRG to determine payments. Under APRDRG payment, a standard rate is multiplied by the relative weight to derive the payment amount for most discharges. Conversely, dividing the amount paid by the relative weight determines the standardized rate. Dividing payments for a group of claims by the sum of the relative weights for those claims is a method commonly used to standardize payments for a population of inpatient discharges. This amount is referred to as a **casemix-adjusted payment**.

To standardize payments across the 1,056,000 discharges used in this analysis, HMA divided the payment for each claim by its APRDRG relative weight to derive a casemix-adjusted payment for each claim. The relative weights used in this analysis are from the "HSRV 3M National Weight Table, Version 38" provided by HCPF.

Supplemental Payment Adjustments

Supplemental payments comprise a significant portion of Colorado hospital Medicaid revenue but are not included in the APCD claims data because they are paid on a periodic lump-sum basis and not at the claim level. Most supplemental payments in Colorado are financed by a provider fee (that is, hospitals are assessed a provider fee to pay for the nonfederal share of the supplemental payments and an additional amount retained by the state).

Medicare also has lump-sum payments, for graduate medical education and bad debts, referred to as passthroughs. Commercial insurance plans may make lump-sum payments to hospitals, such as quality incentive payments, but there is no publicly available data to determine the amounts.

An adjustment is made to increase Medicaid base payments to account for supplemental payments net of the Medicaid share of the provider fee, and an adjustment is made to account for Medicare passthrough payments. The following table describes the data sources, assumptions, and calculations to make these adjustments.

Element	Sources, Assumptions, Calculations
Medicaid payments	Supplemental payments by hospital for fiscal years 2017-2021 were provided by HCPF. • Fiscal year payments were converted to a calendar year basis (for example, CY 2019 payments = 75% of FY 2019 and 25% of FY 2020) • Colorado Healthcare Affordability and Sustainability Enterprise (CHASE) inpatient UPL, uncompensated care, HQIP, and five smaller non-CHASE payments that are targeted to a few hospitals, were included • Excluded DSH and outpatient UPL payments • All of the included payments are considered by HCPF to be inpatient only
Provider fee	The provider fee is assessed on all-payer hospital revenue, and HCPF concluded that only the Medicaid share of the provider fee should be netted against supplemental payments. Provider fees paid by hospital by fiscal year were obtained from HCPF, along with the portion of the provider fee allocable to Medicaid. • The Medicaid portion of provider fees was calculated by multiplying the total provider for the year by HCPF's Medicaid percentage • The provider fee was allocated to inpatient by multiplying the total by the ratio of inpatient CHASE payments to total CHASE payments
Net supplemental payments	The sum of supplemental payments less the inpatient Medicaid portion of the provider fee = net supplemental payments
Medicare passthrough	Medicare passthrough payments are much smaller than Medicaid supplementals. Medicare cost reports for fiscal years ended in 2017, 2018, 2019, 2020, and 2021 were obtained for each hospital, and their inpatient GME and bad debt passthrough payments were extracted.
Proration to APCD claims	Discharges in the APCD represent 76% of Medicaid and 80% of Medicare discharges reported by the hospitals in total. The Medicaid net supplemental payments and Medicare passthrough payments were adjusted to account for the difference in discharges. For each hospital, Medicaid net supplemental payments and Medicare passthrough payments were multiplied by the hospital-specific ratio of APCD discharges to hospital-reported discharges.

Adjustment factors	A hospital-specific adjustment factor was derived by dividing the Medicaid net supplemental payments and Medicare passthrough payments by total base payments for each hospital. There are separate factors for 2017, 2018, 2019, 2020, and 2021 claims.
Adjustments	The Medicaid/Medicare adjustment factors were multiplied by the base payment amounts for Medicaid/Medicare claims to estimate the supplemental or passthrough payment allocable to each individual claim.

See Appendix B for a list of supplemental and passthrough adjustment factors by hospital.

Tableau Workbook

The Tableau workbook has 2 worksheets showing information about discharges, relative price and payers, in tabular and graphical displays. Data visualizations were completed using Tableau Desktop version 2020.3.3 The Tableau workbook is best-viewed in full screen mode.

Data Elements, Groupings, and Filters

The following table defines nine data elements used under the average price method.

Data Element	Description
Discharge Count	Number of discharges
Payment	Total amount payable to the hospital including amounts payable by primary insurance, secondary insurance, and patients (referred to as "allowed")
CMI-Adj Payment	For each discharge, total payment is divided by the APRDRG relative weight to standardize payment for differences in acuity and severity
Average CMI-Adj payment	Average casemix adjusted payment (total casemix adjustment payments divided by discharge count)
Relative price	The ratio of the average casemix adjusted payment for the specific entity (see Groupings section below) compared to the average casemix adjustment payment for the entire population of claims in a given year
Medicare Equivalent Relative Price	The ratio of payment for the specific entity compared to the Medicare equivalent payment for the hospital for the specific claims in a year.
APRDRG Casemix	Average relative APRDRG weight

Seven data elements are used under the Medicare-equivalent method: Discharge Count, Payment, Medicare-equivalent payment, Average Payment, Average Medicare-equivalent, Relative Price, and MS-DRG Casemix.

Groupings: There are five different groupings used in the Tableau workbook. Discharges, payments, and other data may be grouped and summarized by:

- Hospital
- Line of business
- Region (by map selection)
- APRDRG
- Major diagnostic category (MDC)

Filters: There are eight different filters used frequently throughout the workbook, which allow users to select subsets of the claims. The filters are:

Filter Name	Description
Discharge Year	2017, 2018, 2019, 2020, 2021
General or CAH	General or critical access hospitals
DOI Region	The Colorado Department of Insurance region that the hospital is located in
Systems	The system ownership for hospitals that are part of systems (unaffiliated hospitals are in a category called “independent”)
Line of Business	Commercial, Medicaid, Medicare, and Medicare Advantage
Payer Alias	The primary health plan, using numbers in leu of health plan names
APRDRG	The APRDRG classification
MDC	The major diagnostic category

Description of each Worksheet

The following tables describe each of the dashboard by category: dashboard name (color code), purpose, and contents in general. The red worksheets use the average price methodology for relative price and variance calculations (where applicable). The last blue worksheets use the Medicare-equivalent methodology.

Payment and Payment Variation Data by Hospital

Name	**1. Relative Price**
Purpose	Display all key data by hospital, with tabular data displayed.
Contents	Includes all data elements with filters. In a blend of graphical and tabular form.
Name	**2. Relative Price by Payer Alias**
Purpose	Display all key data by hospital and show payer alias variation.
Contents	Includes all data elements with filters. In graphical form including a payer alias display.

Appendix A: Supplemental and Passthrough Adjustment Factors

Name	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
			Medicaid					Medicare		
Animas Surgical	623%	345%	266%	300%	345%	0%	0%	0%	0%	0%
Arkansas Valley	331%	176%	125%	117%	153%	1%	7%	3%	6%	0%
Aspen Valley	291%	265%	173%	305%	212%	0%	0%	0%	0%	0%
Avista Adventist	144%	131%	121%	157%	152%	0%	2%	1%	1%	0%
Banner Fort Collins	95%	92%	85%	135%	134%	2%	2%	0%	2%	1%
Broomfield Hospital	0%	34%	85%	52%	14%	0%	0%	0%	1%	1%
Castle Rock Adventist	61%	64%	57%	88%	95%	0%	2%	1%	1%	1%
Children's Co Springs	0%	0%	7%	15%	15%	0%	0%	0%	0%	0%
Children's Hospital	23%	24%	20%	30%	67%	4%	4%	1%	5%	5%
Colorado Canyons	129%	163%	526%	510%	354%	3%	3%	0%	4%	0%
Colorado Plains	205%	202%	210%	171%	126%	6%	5%	5%	4%	5%
Community Hospital	41%	35%	30%	47%	20%	3%	3%	2%	2%	2%
Conejos County	954%	1006%	375%	561%	706%	5%	3%	4%	4%	0%
Delta County	130%	115%	161%	198%	105%	4%	3%	4%	3%	3%
Denver Health	40%	31%	22%	4%	37%	3%	2%	3%	3%	3%
East Morgan County	347%	275%	328%	456%	431%	3%	4%	6%	2%	0%
Estes Park Health	391%	316%	314%	596%	499%	1%	1%	2%	0%	0%
Foothills Hospital	85%	111%	155%	108%	89%	0%	1%	1%	0%	1%
Good Samaritan	73%	73%	72%	89%	101%	2%	1%	2%	1%	2%
Grand River Hospital	148%	106%	106%	148%	102%	3%	2%	1%	3%	0%
Grandview Hospital	0%	18%	45%	77%	137%	0%	0%	0%	3%	2%
Greeley Hospital	0%	0%	23%	42%	40%	0%	0%	0%	0%	0%
Gunnison Valley	245%	203%	198%	294%	258%	0%	0%	0%	0%	0%
Haxtun Hospital	16931%	0%	2962%	760%	8016%	0%	1%	0%	1%	0%
Heart of the Rockies	274%	266%	191%	295%	199%	0%	0%	1%	0%	0%
Highlands Ranch	0%	0%	17%	35%	58%	0%	0%	0%	0%	0%
Keefe Memorial	1279%	3975%	3027%	3595%	2622%	0%	7%	16%	7%	0%
Kit Carson County	440%	306%	403%	622%	883%	1%	0%	0%	0%	0%
Lincoln Community	622%	432%	453%	1094%	622%	0%	4%	0%	0%	0%
Littleton Adventist	142%	147%	154%	139%	145%	0%	2%	1%	1%	0%
Longmont United	69%	103%	70%	108%	138%	1%	5%	2%	3%	1%
Longs Peak Hospital	213%	121%	79%	97%	64%	0%	1%	1%	1%	1%
Lutheran Med Center	76%	105%	162%	138%	122%	2%	2%	3%	2%	3%
McKee Medical Center	113%	127%	106%	139%	143%	2%	2%	4%	2%	1%
Med Center of Aurora	33%	51%	77%	183%	60%	2%	3%	3%	4%	4%
Med Ctr of the Rockies	101%	145%	148%	69%	33%	1%	1%	1%	1%	1%
Melissa Memorial	1633%	285%	484%	716%	658%	3%	1%	4%	3%	0%
Memorial Hospital	47%	51%	69%	101%	70%	2%	2%	1%	1%	2%
Memorial Hospital	221%	135%	181%	208%	111%	0%	2%	0%	0%	0%
Mercy Regional	143%	171%	158%	159%	34%	1%	1%	2%	1%	1%
Middle Park	679%	769%	765%	807%	1199%	0%	0%	0%	1%	0%
Montrose Memorial	79%	73%	73%	118%	58%	3%	4%	4%	4%	1%
Mt. San Rafael	224%	255%	388%	278%	192%	6%	5%	1%	0%	0%
North Colorado	45%	48%	25%	71%	91%	4%	5%	7%	5%	3%
North Suburban	43%	58%	45%	47%	60%	5%	6%	4%	5%	5%
OrthoColorado	0%	0%	0%	0%	146%	0%	0%	0%	0%	0%
Pagosa Springs	242%	386%	219%	327%	558%	0%	1%	1%	0%	0%
Parker Adventist	77%	93%	122%	107%	112%	0%	2%	1%	1%	1%
Parkview	133%	167%	169%	109%	101%	6%	6%	6%	6%	5%
Penrose-St. Francis	80%	88%	136%	103%	102%	1%	1%	2%	2%	2%
Pikes Peak Regional	459%	1048%	323%	415%	577%	1%	2%	0%	2%	0%
Pioneers Med Center	275%	62%	92%	117%	149%	1%	2%	1%	0%	0%
Platte Valley	74%	94%	89%	94%	82%	1%	2%	3%	2%	3%
Porter Adventist	65%	68%	56%	76%	79%	1%	2%	1%	2%	2%

Poudre Valley	89%	159%	155%	140%	29%	2%	2%	2%	2%	1%
	2017	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**
Name			**Medicaid**					**Medicare**		
Presbyterian-St. Luke's	98%	83%	79%	107%	58%	3%	3%	3%	2%	1%
Prowers Med Center	165%	210%	246%	341%	353%	8%	7%	8%	6%	0%
Rangely District	2484%	6921%	2190%	2016%	2071%	2%	0%	0%	0%	0%
Rio Grande Hospital	293%	365%	417%	368%	381%	1%	1%	0%	0%	0%
Rose Medical Center	163%	111%	83%	65%	78%	3%	3%	3%	3%	2%
San Luis Valley	144%	129%	129%	142%	106%	5%	6%	4%	6%	1%
Sedgwick County	579%	519%	526%	1236%	1703%	3%	4%	3%	3%	0%
Sky Ridge	42%	52%	62%	90%	97%	3%	4%	3%	3%	3%
Southeast Colorado	768%	488%	612%	729%	1141%	5%	3%	0%	3%	0%
Southwest Health	203%	111%	183%	158%	277%	2%	2%	1%	4%	0%
Spanish Peaks	364%	547%	222%	1243%	682%	0%	0%	16%	12%	0%
St. Anthony Hospital	68%	54%	43%	46%	23%	1%	2%	2%	2%	1%
St. Anthony North	79%	110%	73%	53%	35%	3%	4%	5%	4%	2%
St. Anthony Summit	220%	197%	180%	147%	68%	0%	0%	1%	1%	1%
St. Joseph Hospital	123%	116%	80%	126%	122%	4%	4%	5%	4%	4%
St. Mary-Corwin	146%	132%	152%	163%	126%	5%	5%	8%	5%	5%
St. Mary's Hospital	85%	65%	60%	106%	64%	2%	3%	4%	3%	3%
St. Thomas More	83%	163%	172%	158%	133%	2%	3%	0%	3%	0%
St. Vincent General	1061%	464%	671%	2453%	1448%	0%	0%	3%	5%	0%
Sterling Regional	211%	183%	210%	193%	237%	2%	2%	5%	2%	1%
Swedish Med Center	92%	84%	83%	65%	69%	2%	3%	3%	3%	2%
University of Colorado	37%	17%	32%	40%	22%	3%	3%	3%	3%	2%
Vail Health Hospital	196%	272%	222%	84%	57%	0%	0%	0%	0%	0%
Valley View Hospital	176%	136%	139%	188%	126%	1%	1%	1%	1%	1%
Weisbrod Memorial	903%	38309%	4208%	9068%	13272%	9%	6%	1%	11%	0%
Wray Community	200%	226%	192%	509%	461%	1%	2%	2%	2%	0%
Yampa Valley	168%	232%	172%	128%	43%	1%	0%	0%	0%	0%
Yuma District	626%	473%	353%	488%	820%	3%	2%	1%	1%	0%

Appendix B – Medicare Inpatient Payment Calculations

Pricing each claim at "what Medicare would pay" requires compiling many elements from Medicare's complex payment models. The following summarizes the sources of data, and calculations, as well as components of the Medicare payment model that were not used in the analysis.

In general

Medicare payment and pricing models are developed by the Centers for Medicare and Medicaid Services (CMS), an agency under the federal Department of Health and Human Services that has responsibility for administering the Medicare program. CMS publishes payment rate and relative weight information, that may be used along with information on the hospital claim to determine the Medicare payment. The payment rate and relative weight data are summarized below. The claim-specific data necessary to compute Medicare payment are the DRG assignment, charges, and discharge date.

Inputs – hospital specific rates

Most hospitals are paid for inpatient services using the Medicare Prospective Payment System (PPS), whereby the amount paid for a given claim is the hospital-specific rate multiplied by the relative weight for the assigned DRG. An additional payment may be added for outlier cases (claims with an unusually high cost of care). Critical access hospitals and children's hospitals are paid under different methodologies.

To determine the hospital specific rate for PPS hospitals, several inputs are required, as summarized in the table below.

Component	Factor or Adjuster	Source
Operating	national base rate, labor portion	Table 1A-1E
Operating	national base rate, nonlabor portion	Table 1A-1E
Operating	area wage index	PPS Impact File
Operating	indirect medical education adjustment	PPS Impact File
Operating	disproportionate share adjustment	PPS Impact File
Operating	uncompensated care amount per claim	PPS Impact File
Operating	value based purchasing adjustment	PPS Impact File
Operating	readmission adjustment	PPS Impact File
Operating	low volume adjustment	PPS Impact File
Operating	Medicare dependent hospital add-on	PPS Impact File
Operating	hospital-acquired condition reduction	AHRQ website
Operating	uncompensated care amount per claim	PPS Impact File
Operating	cost to charge ratio	PPS Impact File
Capital	national base rate	Table 1A-1E
Capital	geographic adjustment factor	PPS Impact File
capital	indirect medical education adjustment	PPS Impact File
capital	disproportionate share adjustment	PPS Impact File
capital	cost to charge ratio	PPS Impact File

Most of the inputs are used in the calculation of the hospital-specific PPS operating and capital rates. The cost to charge ratios are used in the calculation of outlier payments.

HMA compiled each of these inputs for all PPS hospitals for federal fiscal years 2017 – 2022.

Sources of data – relative weights

Medicare uses the MS-DRG structure, which includes approximately 750 different DRGs and relative weights assigned to each. CMS publishes a new MS-DRG schedule for each federal fiscal year (October 1 – September 30). HMA compiled the relative weights for each DRG for federal fiscal years 2017 – 2022.

Calculations – inlier payment

For PPS hospitals the inlier payment (total payment before outlier adjustment) is calculated by summing the applicable rate components shown above and multiplying the applicable MS-DRG relative weight using the DRG assigned to the claim. The following is an example calculation for three hospitals, using federal fiscal year 2020 inputs, assuming the discharge was assigned a DRG with a 1.50 relative weight

Rate Factor or Adjuster	Denver Health	Parker	Valley View
national base rate, labor portion	$3,959.10	$3,959.10	$3,959.10
area wage index adjustment	8.31	8.31	(10.42)
national base rate, nonlabor portion	1,837.53	1,837.53	1,837.53
indirect medical education adjustment	1,125.11	0.00	0.00
disproportionate share adjustment	815.07	81.21	173.59
quality adjustments	8.71	(51.95)	26.85
Medicare dependent hospital add-on	0.00	0.00	2,501.77
hospital operating rate	**$7,753.84**	**$5,834.20**	**$8,488.41**
national base rate	462.33	462.33	462.33
geographic adjustment factor	0.65	0.65	(0.92)
indirect medical education adjustment	88.09	0.00	0.00
disproportionate share adjustment	82.69	18.90	0.00
hospital capital rate	**$633.75**	**$481.88**	**$461.41**
total operating + capital rates *(a)*	**$8,387.59**	**$6,316.08**	**$8,949.82**
MS-DRG relative weight *(b)*	1.50	1.50	1.50
uncompensated care amount per claim *(c)*	$7,469.80	$769.14	$3,821.87
Medicare inlier payment *((a x b) + c)*	**$20,051**	**$10,243**	**$17,247**

Critical access and children's hospitals are reimbursed by Medicare based on the cost of inpatient services. To estimate the Medicare-equivalent payment for these hospitals, HMA derived an overall ratio of cost to charges from the hospital's cost reports in 2017-2020 and multiplied this ratio by total charges on the claim.

Calculations – outlier payment

The outlier payment compensates PPS hospitals for cases with very high costs relative to the DRG inlier amount. Basically, the outlier formula is as follows:

If cost > threshold, the outlier payment is 80% of the cost above the threshold

- Cost = charges x the hospital's cost-to-charge ratio
- Threshold = the DRG amount plus a fixed value published by CMS (approximately $24,000 in 2020)

Short-stay transfer adjustment

Medicare policy requires a reduction for certain short-stay cases discharged to a post-acute care setting. For selected MS-DRGs, if the discharge disposition is post-acute care (skilled nursing, rehabilitation, or home health agency) and the length of stay is at least one day lower than the mean length of stay for the DRG, Medicare policy requires a payment reduction. The reduction is generally based on the proportion of the actual length of stay to the mean length of stay less one. HMA obtained the discharge disposition for each claim and estimated the short-stay transfer adjustment for all claims meeting the Medicare criteria.

Medicare pricing components not included

Three types of payment adjustments were not utilized in the Medicare-equivalent estimates made by HMA.

- Rate reductions for hospitals that fail to submit quality reporting data or meet electronic health record meaningful use criteria. Hospitals that do not meet these standards face a rate reduction up to three percent. However, these penalties are not common, as the large majority of hospitals meet both standards.

- Organ acquisition costs for solid organ transplant cases. Medicare pays transplant centers an additional payment for the cost of organ procurement, and the cost of certain pre-transplant physician and facility evaluation services. This is a complex, hospital-specific, and organ-specific calculation and involves a small percentage of discharges. In the 2017-2020 dataset approximately 0.1% of total claims are for solid organ transplant and less than half are commercial or Medicaid.

- New technology adjustments. Medicare annually approves a handful of costly drugs and devices for a special new technology payment adjustment. Generally, the amounts are not material compared to total Medicare payment and identifying the use of these drugs and devices would add significant complexity to the analysis.

HMA does not believe that excluding these payment adjustments causes material differences in the overall results but could be material at the individual claim level. Accordingly, it is useful to understand the Medicare-equivalent payments are estimates and may not represent the exact amount that Medicare would pay. In the future, HCPF is looking at alternative Medicare-equivalent payment estimation methodologies to provide more accurate estimations.