NORC at the University of Chicago

The Pennsylvania Rural Health Model (PARHM)

Fourth Annual Evaluation Report Appendix

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Appendix A. Model Participants

Appendix Exhibit A.1. Participating Hospitals

Hospital	County	Ownership*	Hospital Type	Located in FORHP-designated Rural Area	PY 1 (2019)[1]	PY 2 (2020)[2]	PY 3 (2021)[3]	PY 4 (2022)	Beds	NPR (Millions)†	Medicare NPR Share	Medicaid NPR Share
Cohort 1												
Barnes-Kasson County Hospital	Susquehanna	Independent	CAH	Yes	✓	✓	✓	✓	25	$18.39	37.68%	23.21%
Endless Mountains Health Systems	Susquehanna	Independent	CAH	Yes	✓	✓	✓	✓	25	$19.15	55.39%	10.31%
Geisinger Jersey Shore	Lycoming	System	CAH	No	✓	✓	✓	✓	25	$37.93	41.16%	15.16%
UPMC Kane	McKean	System	PPS	Yes	✓	✓	✓	✓	31	$21.76	52.88%	12.99%
Wayne Memorial Hospital	Wayne	Independent	PPS	Yes	✓	✓	✓	✓	87	$106.61	41.22%	11.51%

Hospital	County	Ownership*	Hospital Type	Located in FORHP-designated Rural Area	PY 1 (2019)[1]	PY 2 (2020)[2]	PY 3 (2021)[3]	PY 4 (2022)	Beds	NPR (Millions)[†]	Medicare NPR Share	Medicaid NPR Share
Cohort 2												
Armstrong County Memorial Hospital	Armstrong	Independent	PPS	Yes		✓	✓	✓	147	$120.32	49.25%	9.41%
Chan Soon-Shiong Medical Center at Windber	Somerset	Independent	PPS	Yes		✓	✓	✓	54	$42.15	54.95%	12.77%
Fulton County Medical Center	Fulton	Independent	CAH	Yes		✓	✓	✓	21	$49.52	42.63%	9.32%
Penn Highlands Mon Valley (formerly Monongahela Valley Hospital)	Washington	System	PPS	No		✓	✓	✓	200	$118.42	55.02%	13.31%
Punxsutawney Area Hospital	Jefferson	Independent	PPS	Yes		✓	✓	✓	49	$46.11	47.66%	14.17%
Penn Highlands Tyrone (formerly Tyrone Hospital)	Blair	System	CAH	No		✓	✓	✓	25	$25.31	46.67%	20.01%
Washington Health System Greene	Greene	System	PPS	Yes		✓	✓	✓	12	$17.69	45.03%	21.08%
Washington Health System Washington Hospital	Washington	System	PPS	No		✓	✓	✓	160	$224.73	46.25%	15.35%

Hospital	County	Ownership*	Hospital Type	Located in FORHP-designated Rural Area	PY 1 (2019)[1]	PY 2 (2020)[2]	PY 3 (2021)[3]	PY 4 (2022)	Beds	NPR (Millions)†	Medicare NPR Share	Medicaid NPR Share
Cohort 3												
Clarion Hospital	Clarion	System	PPS	Yes			✓	✓	67	$54.22	47.64%	5.51%
Highlands Hospital	Fayette	System	PPS	No			✓	✓	61	$23.51	42.25%	27.67%
Indiana Regional Medical Center	Indiana	Independent	PPS	Yes			✓	✓	166	$186.48	51.13%	10.51%
Meadville Medical Center	Crawford	System	PPS	Yes			✓	✓	200	$226.13	59.99%	12.37%
Bradford Regional Medical Center	McKean	System	PPS	Yes			✓	✓	10	$42.68	47.71%	18.53%

NOTES: Hospital Type indicates whether the hospital is an acute care hospital reimbursed under the prospective payment system (PPS) or a critical access hospital (CAH) that receives cost-based reimbursement. *Ownership status is current as of December 2023, and is based on whether the system includes at least one other hospital. Tyrone Hospital was acquired by Penn Highlands in November 2020. Monongahela Valley Hospital was acquired by Penn Highlands in October 2021. Highlands Hospital was acquired by Penn Highlands in April 2022. †NPR is net patient revenue; 2020/2019 data submitted as a part of PY 2/PY 3 updates to the hospital transformation plans. Medicare NPR share includes FFS and Medicare Advantage (MA) patients.

Appendix Exhibit A.2. Commercial Payer Participation by Model Performance Year

Health Plan	Products Included			Participation Years			
	Medicare Advantage	Medicaid MCO	Commercial‡	PY 1 (2019)	PY 2 (2020)	PY 3 (2021)	PY 4 (2022)
Geisinger Health Plan	✓	✓	✓	✓	✓	✓	✓
Highmark Blue Cross Blue Shield	✓	Via affiliate, Highmark Wholecare	✓	✓	✓	✓	✓
UPMC Health Plan	✓	✓	✓	✓	✓	✓	✓
Highmark Wholecare (formerly Gateway)	✓	✓	N/A	✓	✓	✓	✓
Aetna	✓	✓	✓	N/A	✓	✓	✓

NOTES: ‡The types of insurance products included in the commercial product line vary by payer (for example, inclusion of employer self-funded products). MCO = managed care organization.

Appendix B. Analytic Methods

We use a convergent mixed-methods design, using both quantitative and qualitative data to analyze activities, outcomes, and relationships.[1] The evaluation combines qualitative and quantitative analyses, conducted in parallel, that consider participating and non-participating hospitals, their community partners, and the broader context in which they operate to address rural community health needs. The qualitative approach to capture these model components, implementation, and outcomes includes document review; annual site visits and interviews with participating hospitals; and telephone interviews with other partners (that is payers, community partners, Commonwealth and RHRC staff, technical experts, or non-participating hospitals). For the quantitative approach, we leveraged multiple data sources (Medicare FFS claims data, Medicaid claims data, Healthcare Cost Report Information System [HCRIS] reports, and global budget workbooks) to descriptively assess revenues, financial health, market conditions, and clinician turnover at participating hospitals, as well as population health and quality of care outcomes in participating hospitals' market areas before and after model implementation.

Appendix Exhibit B.1. Evaluation Research Questions (RQ)

Required Research Questions
• RQ1: What are participating hospitals' experiences implementing their Hospital Transformation Plans? What factors do participant hospitals cite as barriers or facilitators to operating under the Model?
• RQ2: What are beneficiaries' experiences in the Model? What are the opinions of the Model from other important model stakeholders (e.g., non-hospital providers, rural community leaders)?
• RQ3: How has Medicare spending and service line utilization changed for participating hospitals? Have the changes to participating hospitals' infrastructure stabilized or improved their financial status and, if so, how?
• RQ4: How has the quality of care received by Medicare beneficiaries at participating hospitals changed?
• RQ5: What are the reasons that some rural hospitals choose not to participate or defer participation until later performance years?
• RQ6: How do the characteristics of participating hospitals compare to non-participating rural hospitals in PA and other rural hospitals from across the country?
Optional Research Questions • Additional emphasis should be made for health equity considerations in findings related to the questions below • Identify outcomes and processes related to transformation activities that can inform the design of future state-based and rural health models
• RQ7: How did the health care system and state health agencies collaborate to improve the population health of rural Commonwealth residents?

Required Research Questions

- RQ8: Have the model specific population health measures changed throughout the course of the model?
- RQ9: What, if any, evidence is there of changes in quality of care provided to Medicare beneficiaries in the rural areas surrounding the participating hospitals?
- RQ10: What are the implications of the Model results for other potential rural-area based models?
- RQ11: Are there any unanticipated or spillover effects from the Model such as barriers to care (e.g., increased travel time to emergency rooms) and shifting of care to non-participating hospitals?
- RQ12: What changes have occurred in hospital spending, total cost of care, and health care utilization for Medicaid beneficiaries over the course of the model?
- RQ13: Do specific elements of hospital transformation plans coincide with changes in total Parts A and B spending and utilization or changes in quality of care?

Qualitative Methods

We gathered primary data to understand the experiences and perspectives of PARHM's multiple stakeholders and provide insight into a variety of model-related topics.

Data Sources

This report draws on two qualitative data sources: 1) model documents and 2) site visits and interviews (45-90-minute interviews conducted in-person or virtually using videoconference software).

Model Documents. The research team conducted a systematic review of the model documentation (for example, model agreement, model budgets, contracts, and hospital transformation plans). These documents informed key informant outreach and interview guide development.

Site Visits and Interviews. The purpose of the site visits was to obtain firsthand information about the implementation of the model, motivations to participate, model-associated outcomes, challenges, and suggestions for improvement. Additionally, based on findings from prior reports and the updated document review, the research team selected topics of interest to investigate in more detail which included reconciliation and finance, behavioral health transformation, and interactions and alignment between the model and other value-based care programs. The research team used a purposive sampling approach to select model implementation partners and the team members with a set of distinct roles (for example, leadership, clinical leaders, clinicians) associated with each participating hospital. Document review also informed the relevant hospital team member roles at each site. The final list of key informants included individuals from the following categories (number of individuals):

- Commonwealth leadership and implementation partners involved with the model (that is the Department of Health, state offices, agencies, technical experts) (3)
- Cohort 1 participating hospital leadership and staff (17)
- Cohort 2 participating hospital leadership and staff (14)
- Cohort 3 participating hospital leadership and staff (8)
- Participating and non-participating health system leadership (4)
- Community partners (4)
- Participating commercial payers (7)

The team developed semi-structured interview guides for the site visits and interviews based on each category of key informants and tailored these interview guides in advance of each site visit or interview. **Exhibit B.2** includes informant types and associated topics.

A two- or three-person team conducted 42 interviews from May through October 2023.[a] A senior member of the team facilitated each interview using a semi-structured interview guide, and a research analyst took detailed notes during each interview. Each interview was recorded with the participants' consent and professionally transcribed following the interviews.

Appendix Exhibit B.2. Interview Topics by Informant Type

Informant Type	Interview Topics
Commonwealth leadership	• Perspectives on model design and development • Barriers and facilitators to model implementation, including participant recruitment, global budgets, hospital transformation plans • Engagement with hospital and payer participants • Use of program data to monitor program • Perspective on model effectiveness • Lessons learned and sustainability of program
Implementation partners	• Approaches to technical assistance • Perspectives on the model effectiveness and hospital readiness • Barriers and facilitators to model implementation and technical assistance • Lessons learned and potential areas of improvement
Hospital and health system leadership	• Process for decision-making and stakeholder engagement • Experiences with global budget planning implementation • Experiences with hospital transformation plan implementation • Perspectives on technical support and assistance • Model impact on hospital staffing and hospital leadership • Suggestions for the Center for Medicare & Medicaid Innovation and advice to other rural hospitals

[a] While we conducted interviews with 57 individuals, some interviews were group interviews.

Informant Type	Interview Topics
Hospital staff	• Experiences with planning and implementing hospital transformation activities and initiatives • Engagement with community partners and technical assistance providers • Changes and outcomes since the implementation of transformation activities • Barriers and facilitators to model implementation
Community partners	• Relationship to the hospital and awareness of the hospital's involvement in the model • Designated roles and activities in the implementation of the model • Experiences with collaborating with other community organizations and technical assistance providers • Barriers and facilitators to collaboration efforts • Perspectives on model impact on community
Commercial payers	• Background and involvement with the model • Motivation for participating in the model and discussion on the approval process • Perspectives on model implementation and hospital readiness • Perspectives on global budget and sustainability • Model impact on financial stabilization and quality of care

Qualitative Analysis

Document Review Process for PY 4 (2022) Hospital Transformation Plans. The hospital transformation plans included eight high-level transformation categories: substance use, behavioral health, access, operational efficiency, care management, emergency department (ED) utilization, geriatric care, and "other." For this report we are only reporting on the behavioral health and substance use goals and proposed action steps which can be found in Chapter 3: Behavioral Health Transformation. We coded all hospital transformation plan goals and proposed action steps to inform future data collection activities.

Using the hospital transformation plans, we inductively developed a codebook using a domain/process framework. The domain codes were used to categorize the goals and action steps by the specific subject matter areas hospitals focused on (for example, *primary care* or *diabetes*). The process codes delineated the proposed action steps hospitals would take to reach their transformation goals (for example, *engage community partners*, *develop and/or implement protocols or workflows*). More than one domain code and/or more than one process code could be applied to each goal and action step. Each hospital transformation plan was coded by a different coder three separate times with each round of coding reconciling previous rounds to improve inter-coder reliability. The coding process identified a high degree of goal overlap, redundancies, similarities, and patterns across different hospital transformation plans and within individual plans.

Codebook Development for Semi-Structured Interviews. Using the interview guides and research questions, the team developed an initial set of codes and then updated the codebook with emerging themes throughout the analysis. The analysis employed both inductive and deductive methods to examine implementation partner, hospital, and payer participant perspectives on the implementation, financial, organizational, and programmatic features of the model. As part of the initial data collection efforts each year, the team reviewed and refined the

codebook to account for the complexity of the model and associated changes relevant to participants' implementation experience.

Data Analysis. The team reviewed all the transcribed interviews for accuracy and quality. Once each transcript was reviewed, an analyst uploaded the transcript to the Dedoose software® to facilitate coding and analysis. The team conducted thematic analysis of the data, identifying relevant themes and areas of convergence or divergence across the participants and implementation partners. Multiple team members coded the first set of interviews and met to discuss areas where the code application was unclear or inconsistent. This process served to improve the team's inter-coder reliability and identify any necessary revisions to the codebook. The analysis involved a review of findings within and across codes to understand themes across different hospital types and from the perspective of participants and implementation partners.

Quantitative Methods

This appendix includes additional information regarding the quantitative methods and analyses found in Chapters 2 (Experiences with the Global Budget and Reconciliation), Chapter 3 (Behavioral Health Transformation), and Chapter 4 (Interactions/Alignment between PARHM and other Value-Based Models).

Market Area Definition

Our evaluation uses a market area definition based on each participating hospital's rural geographic area (RGA), which was defined as part of the Commonwealth's agreement with the Innovation Center. Each hospital's RGA is defined as the ZIP codes from which a participating hospital draws the majority of its patients.[2] The model uses the RGA to inform key activities, including calculating total cost of care (TCOC) guardrails, monitoring participating hospitals' TCOC, monitoring leakage or unintended volume shifts and migration trends, monitoring trends in Medicare fee-for-service (FFS) enrollment and service area characteristics, and reporting population health quality metrics.[3]

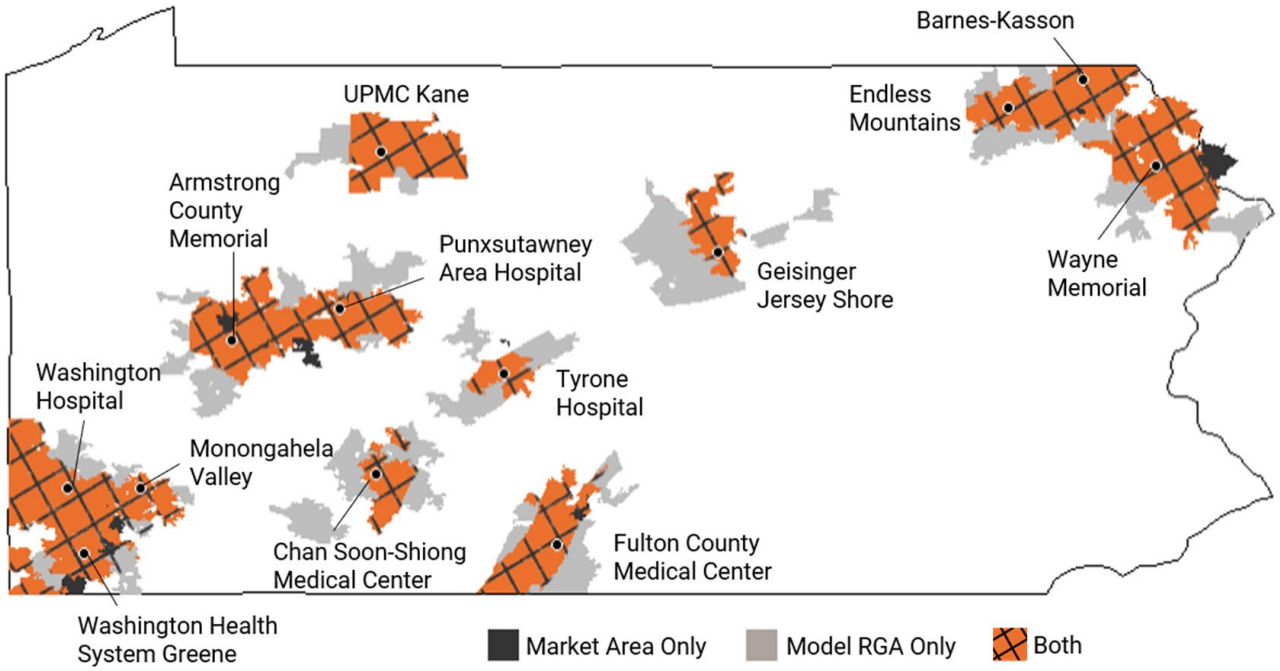
We use Medicare data to select ZIP codes for inclusion in the market area, calculated separately for each participating hospital. We define the market area using the following steps:

1. Using the Medicare Beneficiary Summary File for the year prior to each hospital joining the model, select patients living in Pennsylvania ZIP codes.
2. For patients identified in step 1, pull all Medicare FFS claims that are included in the scope of the model's global budget.
3. Using the claims identified in step 2, calculate the total revenue for the hospital in each Pennsylvania ZIP codes and rank in descending order.
4. Retain ZIP codes from step 3 that comprise at least 0.75% of a hospital's total revenue.
5. Using the claims identified in step 2, rank providers by total revenue in each Pennsylvania ZIP code.

6. Add any ZIP code wherein the hospital is one of the top two providers from step 5, if they are not already included in the list in step 4.

This market area definition includes areas where the hospital has the most market share and total revenue, which are the areas most likely to be affected by the model's transformation activities. This narrow definition allows the evaluation to assess model outcomes on areas directly targeted by model activities, rather than effects on a broader geographical area. The model's RGA follows the same steps 1 through 6 as listed above, but also includes all Pennsylvania ZIP codes that contribute to a cumulative 75% of revenue for each hospital, which is a broader definition than the market area definition we are using for the evaluation. **Appendix Exhibit B.3** displays the overlap between the ZIP codes included in the evaluation's market area definition and the model's RGA definition.

Appendix Exhibit B.3. Cohort 1 and Cohort 2 Market Area and Rural Geographic Areas



The choice of method for defining the hospital market area has a significant bearing on the analytic sample size. We utilized a modified version of the "blended logic" approach used by the Program Analysis Contractor to define the market areas because the market area definition struck a good balance between accounting for most of the participating hospitals' inpatient and outpatient overall revenue, and the footprint of the hospitals, as measured by market share, in the selected market areas. **Appendix Exhibit B.4** presents the revenue and market share thresholds as well as the analytic sample size for the two participation scenarios. We also considered an alternative market area definition based on a lower market rank threshold because none of the ZIP codes for one hospital in participation scenario #2 met the market rank criteria.

Appendix Exhibit B.4. Defining Hospital Market Areas

Participation Scenario	Number of Participating Hospitals	Revenue Floor	Market Rank Threshold	Average Hospital Revenue Share	Average Hospital Market Share	Number of ZIP Codes	Number of Patients in Selected ZIP Codes
#1	17	0.75%	Rank <= 2	84%	27%	162	**81,106**
	17	0.75%	Rank <= 3	84%	27%	194	**98,334**
#2	24	0.75%	Rank <= 2	83%	25%	210	**111,958**
	24	0.75%	Rank <= 3	85%	23%	252	**133,816**

NOTES: Revenue Floor Threshold – The overall contribution of the ZIP code to the hospital's inpatient and outpatient revenue should exceed this threshold in order for the ZIP code to be selected. Market Rank Threshold – The hospitals' inpatient and outpatient services market share ranking should be at or lower than the specified rank. Average Hospital Revenue Share – Average of the hospitals' revenue share attributable to the pool of selected ZIP code.; Average Hospital Market Share – Average of the hospitals' average market share of the selected ZIP codes.

While narrower than the RGAs defined within the model, the above methodology still captures fairly broad geographic areas where the impact of hospitals' transformation activities may be dilute and difficult to see in spending, utilization, and quality outcomes.

Data Sources

Appendix Exhibit B.5 lists the data, years, and sources used for the quantitative analyses. We also include a description of how the data was used.

Appendix Exhibit B.5. Data Sources for Quantitative Analyses

Data	Years	Rationale	Source(s)
Medicare Parts A and B enrollment database and claims files	CY 2013-CY 2022	Assess Medicare fee-for-service interim payments, reimbursement, and service mix	Centers for Medicare & Medicaid Services (CMS) Chronic Conditions Warehouse Virtual Research Data Center
Medicaid Statistical Information System (T-MSIS) Analytic Files	CY 2016 – CY2021	Assess utilization and quality of care for the Medicaid and CHIP population	Centers for Medicare & Medicaid Services (CMS) Chronic Conditions Warehouse Virtual Research Data Center
Medicare cost reports	FY 2013-FY 2021	Assess hospital profitability, liquidity, cost-based reimbursement, and capital, cost, and revenue structure	CMS
Global budgets payments spreadsheets	CY 2021	Assess Global Budget payments	CMS

Specifications for Descriptive Measures

Appendix Exhibit B.6 lists the hospital level financial performance measures, including specifications and sources for each measure. **Appendix Exhibit B.7** lists the quality of care measures including their source and a brief description. **Appendix Exhibit B.8** lists specifications for other measures.

Appendix Exhibit B.6. Specifications for Financial Performance Descriptive Measures

Measure	Specification
Operating Margins	Excess of revenues over expenses as a percentage of total revenue. Revenues and costs not attributable to direct patient care are excluded. Indicates the hospital's overall financial strength and ability to generate operational profits. Formula: (Net Income less operating expenses / Operating Revenue) Medicare Cost Report Data Elements: Worksheet G-3, Lines 4, 8-22, 24
Days Cash on Hand	Indicates the participating hospitals' cash flow relative to the size of their expenses. Formula: (Cash + Temporary Investments + Investments) / [(Total Expenses – Depreciation) / Days in Period)] Medicare Cost Report Data Elements: Worksheet A, Column 2, Lines 1-3; Worksheet A Column 3, Line 200; Worksheet G, Column 1-4, Lines 1-2, 31
Long-term Debt to Capitalization Ratio	Indicates the hospital's ability to sustain accumulated debt. Formula: (Long-Term Debt / (Long-Term Debt + Net Assets)) Medicare Cost Report Data Elements: Worksheet G, Column 1-4, Lines 40, 50, and 59
Total Operating Costs	Indicates hospitals' total operating costs, computed as the sum of total salaries and total other costs. Medicare Cost Report Data Elements: Worksheet A, Column 1, Line 200; Worksheet A, Column 2, Line 200.
Salaries to Net Patient Revenue	Salary expenses as a percentage of net patient revenue. Indicates the staffing efficiency of the hospital. Formula: (Salary expense / Net Patient Revenue) Medicare Cost Report Data Elements: Worksheet A, Column 1, Row 200; Worksheet G-3, Line 3
Total Compensation to Net Patient Revenue (PPS hospitals only)	Total compensation expenses (sum of salaries, benefits, and contract labor expenses) as a percentage of net patient revenue. Indicates the staffing efficiency of the hospital. Formula: (Salary expense + Benefits Expense + Contract Labor Expense) / Net Patient Revenue Medicare Cost Report Data Elements: Worksheet S-3 Part II, Column 4, Row 1; Worksheet S-3 Part II, Column 4, Rows, 11, 12, 13, 14, 14.01, 14.02, 15, 16, 16.01, 16.02; Worksheet S-3 Part II, Column 4, Rows 17, 18, 19, 20, 21, 22, 22.01, 23, 24, 25, 25.50, 25.51, 25.52, 25.53; Worksheet G-3, Line 3

Measure	Specification
Inpatient Occupancy Rate	Expressed as the total number of patient days divided total number of bed-days available Medicare Cost Report Data Elements: Worksheet S3 Part I, Columns 3 & 8, Line 14

Appendix Exhibit B.7. Specifications for Quality Measures

Measure	Steward	Specification
Tobacco Screening and Cessation Intervention	NCQA	Percentage of patients aged 18 years and older who were screened for tobacco use one or more times within 24 months AND who received tobacco cessation intervention if identified as a tobacco user
Pharmacotherapy for Opioid Use Disorder	NCQA	The percentage of opioid use disorder (OUD) pharmacotherapy treatment events among members age 16 and older that continue for at least 180 days (6 months) without a gap in treatment longer than 7 days unless explained by an inpatient stay.
7- and 30-day Follow up after ED Discharge for Alcohol or other Drug Abuse	NCQA	Rate of emergency department (ED) visits for members 13 years of age and older with a principal diagnosis of substance use disorder (SUD), or any diagnosis of drug overdose, who had a follow up visit for SUD.
7- and 30-day Follow up after ED Discharge for Mental Illness	NCQA	Rate of emergency department (ED) visits for adults and children 6 years of age and older with a diagnosis of mental illness or intentional self-harm and who received a follow-up visit for mental illness within 7 and 30 days.
Prevalence of chronic conditions	CMS CCW	Presence of chronic conditions defined by CCW algorithms[b]. Rates are expressed as a percentage of the total population with a claims basis for the condition.

Appendix Exhibit B.8. Specifications for Other Measures

Measure	Specification
Clinician Turnover	A clinician is considered as having meaningful presence at a hospital if they are listed as a rendering, attending, operating, or other physician on at least 12 claims attributable to that hospital's CCN in the year. A clinician is considered as losing their presence at the hospital in any year in which they have 11 or fewer claims.
Hospital Market Concentration	HHI expressed as the sum of the squared market shares (expressed as a percentage) of providers active in the market. Services included in the analysis are those covered by the global budget. Providers included in the analysis are those physically present in the hospital's market area, and which provided at least one global-budget covered service to a Medicare FFS beneficiary during the year.

[b] https://www2.ccwdata.org/web/guest/condition-categories

Case Study Approach

Based on prior interviews and the document review, we selected three topics of interest to investigate in more detail using a case study approach. A case study approach is an ideal method for in-depth and multi-faceted exploration of complex issues in real world settings. It is also a valuable method to capture explanatory information relevant to "why" hospitals chose (or did not choose) to participate in the model, "how" the model is being implemented and received on the ground, and "what" barriers and facilitators impact implementation.[4] The mixed-methods case studies included (1) Experiences with the Global Budget and Reconciliation, (2) Behavioral Health Transformation, and (3) Interactions/Alignment Between PARHM and Other Value-Based Care Programs, and aimed to achieve the following goals:

Experiences with the Global Budget and Reconciliation: Examine hospital revenues, financial performance, and experiences under the global budget and drivers of reconciliation settlements.

Behavioral Health Transformation: Explore participating hospitals' experiences implementing behavioral health focused transformation goals, including contextual factors, barriers, and facilitators.

Interactions/Alignment Between PARHM and Other Value-Based Care Programs: Describe how PARHM interacts with existing VBC programs and identify the degree of overlap between Shared Savings Program ACO and PARHM fee-for-service (FFS) patients living in the market areas of participating PPS hospitals.

Parallel methodologies were used to examine each case, including a combination of implementation partner, hospital staff and leadership, community provider, and patient interviews, documentation review, and quantitative data analysis. **Appendix Exhibit B.9** illustrates the specific data sources that informed each case study.

Appendix Exhibit B.9. Case Study Data Sources

Case Study	Document Review	Implementation Partner, Hospital, Payer, and Community Partner Interviews				Quantitative Data*
		2020	2021	2022	2023	
Experiences with the Global Budget and Reconciliation	X	X	X	X	X	X
Behavioral Health Transformation	X	X	X	X	X	X
Interactions/Alignment Between PARHM and Other Value-Based Care Programs	X	X	X	X	X	X

NOTE: *See Appendix Exhibit B.5 for the quantitative data sources.

Limitations

Our analysis has several limitations. First, the small number of participants [18 participating hospitals as of PY 3 (2021)] limits our ability to make meaningful comparisons to eligible non-participating hospitals or national or statewide benchmarks. Second, due to sample size, our analyses are insufficiently powered to detect impacts in the expected range of 5% or less; thus, we determined an impact analysis was not feasible. The results of our quantitative descriptive analyses cannot be attributed solely to the model. For the descriptive assessment, we are solely observing the trends in outcomes of interest, not isolating the impact of the model on those outcomes. Third, our analyses include qualitative data from only a sample of participating hospital staff, participating payers, and community partners. While these data include representation from a variety of hospital types (CAH and PPS) and hospital ownership/affiliations (independent and system owned), they do not include all hospital participants. Finally, the small number of hospitals, coupled with important variations in hospital type and affiliation, limits the external generalizability of the findings in our case studies.

Appendix C. Quantitative Measures Tables

Appendix Exhibit C.1. Financial Performance Hospital Participants and Eligible Non-Participants (FY 2013-FY 2020)

Measure	Hospital Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	Data Source
Average Operating Margin (%)	All	-2.86%	-2.86%	-2.86%	-2.86%	-2.86%	-2.86%	-2.86%	-2.86%	-2.86%	Medicare Cost Reports
	CAH	-1.32%	-9.20%	-6.71%	-6.97%	-9.58%	-9.95%	-6.56%	5.67%	-0.63%	Medicare Cost Reports
	PPS	-3.56%	-2.45%	-2.39%	-3.39%	-4.26%	-0.73%	-5.10%	-7.87%	-7.47%	Medicare Cost Reports
Average Total Operating Costs ($)	All	$ 140,989,302	$ 145,450,83	$ 153,672,212	$ 149,585,783	$ 146,763,986	$ 46,621,668	$ 143,415,790	$ 146,290,894	$148,466,889	Medicare Cost Reports
	CAH	$ 30,493,979	$ 33,785,048	$ 35,095,397	$ 33,489,173	$ 33,265,229	$ 33,108,364	$ 32,194,903	$ 31,042,071	$ 32,095,290	Medicare Cost Reports
	PPS	$ 110,495,323	$ 111,665,783	$ 118,576,814	$ 116,096,609	$ 113,498,757	$ 113,513,305	$ 111,220,886	$ 115,248,823	$ 116,371,600	Medicare Cost Reports
Inpatient Occupancy Rate (%)	All	42.80%	42.80%	42.80%	42.80%	42.80%	42.80%	42.80%	42.80%	42.80%	Medicare Cost Reports
	CAH	38.65%	36.19%	34.90%	31.41%	31.57%	26.16%	23.05%	22.35%	33.05%	Medicare Cost Reports
	PPS	44.69%	45.02%	42.49%	40.73%	38.21%	37.36%	33.19%	35.97%	38.01%	Medicare Cost Reports
Days Cash on Hand	All	93.73%	93.73%	93.73%	93.73%	93.73%	93.73%	93.73%	93.73%	93.73%	Medicare Cost Reports
	CAH	45.16	35.71	34.28	37.07	32.50	37.64	113.12	104.11	117.08	Medicare Cost Reports
	PPS	115.80	118.11	95.45	102.09	107.89	96.13	170.20	162.64	130.09	Medicare Cost Reports

Measure	Hospital Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	Data Source
Long Term Debt to Capitalization Ratio	All	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	Medicare Cost Reports
	CAH	0.61	0.66	0.75	0.77	0.81	0.96	0.72	0.52	0.49	Medicare Cost Reports
	PPS	0.43	0.51	0.44	0.41	0.41	0.45	0.60	0.58	0.41	Medicare Cost Reports
Salaries to Net Patient Revenue Ratio	All	0.45	0.44	0.44	0.45	0.46	0.45	0.46	0.46	0.45	Medicare Cost Reports
	CAH	0.46	0.47	0.45	0.45	0.47	0.48	0.49	0.48	0.43	Medicare Cost Reports
	PPS	0.45	0.43	0.44	0.44	0.45	0.44	0.45	0.45	0.46	Medicare Cost Reports
Total Compensation to Net Patient Revenue Ratio	All	0.60	0.58	0.59	0.61	0.61	0.59	0.60	0.61	0.64	Medicare Cost Reports
	CAH	-	-	-	-	-	-	-	-	-	Medicare Cost Reports
	PPS	0.60	0.58	0.59	0.61	0.61	0.59	0.60	0.61	0.64	Medicare Cost Reports

Appendix Exhibit C.2. Medicare Advantage Penetration in PARHM Participating Market Areas

Market	2014	2015	2016	2017	2018	2019	2020	2021	2022
PPS	41.08%	41.92%	42.48%	43.53%	44.71%	45.89%	48.09%	50.02%	52.21%
CAH	30.01%	30.57%	30.70%	31.85%	32.92%	34.90%	37.07%	39.67%	42.88%

DEFINITIONS: PPS = Participating PPS hospital market areas. CAH = Participating CAH market areas

Appendix Exhibit C.3. Value of Global Budget Adjustments Relative to Baseline Budget for Budget Year 2021 (PPS Hospitals Only)

Market	UVS	PSL	Clinic	Non-Hospital	Low Volume	PAU	Total
Hospital 1	3.18%	5.54%	0.02%	0.00%	0.00%	-0.10%	8.63%
Hospital 2	-2.29%	4.12%	5.20%	0.00%	-0.40%	-0.11%	6.53%
Hospital 3	3.37%	0.00%	1.54%	0.00%	0.92%	-0.29%	5.55%
Hospital 4	4.97%	0.00%	-0.89%	0.00%	0.00%	-0.01%	4.07%
Hospital 5	4.05%	0.00%	-0.05%	0.00%	0.36%	-0.55%	3.82%
Hospital 6	-8.81%	-0.75%	-1.26%	14.52%	0.00%	-0.24%	3.46%
Hospital 7	1.29%	0.00%	0.41%	0.00%	0.00%	-0.10%	1.60%
Hospital 8	0.00%	0.00%	0.04%	0.00%	0.00%	-0.19%	-0.16%
Hospital 9	0.00%	-0.17%	0.00%	0.00%	0.00%	-0.10%	-0.27%
Hospital 10	-2.89%	0.00%	0.75%	0.00%	-0.06%	-0.11%	-2.30%
Hospital 11	-2.69%	-0.48%	-0.47%	0.32%	0.00%	-0.25%	-3.56%
Hospital 12	-13.59%	1.20%	2.14%	0.00%	0.00%	-0.21%	-10.46%
Hospital 13	-2.51%	0.00%	-10.89%	0.00%	-0.13%	-0.23%	-13.76%

DEFINITIONS: UVS = Unplanned volume shift adjustment, PSL = Planned service line change adjustment, Clinic = Clinic adjustment, Non-hospital = Non-hospital shift adjustment, Low Volume = Low volume adjustment, PAU = Potentially avoidable utilization adjustment

Appendix Exhibit C.4. Biweekly Fee for Service Revenues and Global Budget Payments for Participating Hospitals – Cohort 1

Time Period	FFS Payment Cohort 1 – CAH	GB Payment Cohort 1 – CAH	FFS Payment Cohort 1 – PPS	GB Payment Cohort 1 – PPS
2019 – biweek 1	$ 167,318.0	$ 193,395.3	$ 501,919.2	$ 562,677.3
2019 – biweek 2	$ 140,514.7	$ 193,395.3	$ 427,230.1	$ 562,677.3
2019 – biweek 3	$ 138,080.7	$ 193,395.3	$ 498,960.0	$ 562,677.3
2019 – biweek 4	$ 115,787.9	$ 193,395.3	$ 492,993.8	$ 562,677.3
2019 – biweek 5	$ 157,678.2	$ 193,395.3	$ 505,372.3	$ 562,677.3
2019 – biweek 6	$ 166,355.7	$ 193,395.3	$ 587,371.2	$ 562,677.3
2019 – biweek 7	$ 151,237.3	$ 193,395.3	$ 598,366.9	$ 562,677.3
2019 – biweek 8	$ 129,355.3	$ 193,395.3	$ 476,203.4	$ 562,677.3
2019 – biweek 9	$ 143,435.2	$ 193,395.3	$ 599,181.4	$ 562,677.3
2019 – biweek 10	$ 156,562.2	$ 193,395.3	$ 592,221.5	$ 562,677.3
2019 – biweek 11	$ 156,051.5	$ 193,395.3	$ 540,827.5	$ 562,677.3
2019 – biweek 12	$ 125,666.9	$ 193,395.3	$ 599,339.3	$ 562,677.3
2019 – biweek 13	$ 132,359.3	$ 193,395.3	$ 554,170.0	$ 562,677.3
2019 – biweek 14	$ 155,237.5	$ 193,395.3	$ 482,956.8	$ 562,677.3
2019 – biweek 15	$ 165,757.9	$ 193,395.3	$ 535,594.4	$ 562,677.3
2019 – biweek 16	$ 136,421.4	$ 193,395.3	$ 488,058.8	$ 562,677.3
2019 – biweek 17	$ 144,108.5	$ 193,395.3	$ 589,697.8	$ 562,677.3
2019 – biweek 18	$ 157,893.7	$ 193,395.3	$ 498,550.1	$ 562,677.3
2019 – biweek 19	$ 156,203.1	$ 193,395.3	$ 572,963.3	$ 562,677.3
2019 – biweek 20	$ 179,077.9	$ 193,395.3	$ 583,991.9	$ 562,677.3
2019 – biweek 21	$ 199,727.6	$ 193,395.3	$ 540,104.0	$ 562,677.3
2019 – biweek 22	$ 137,526.3	$ 193,395.3	$ 505,424.5	$ 562,677.3

Time Period	FFS Payment Cohort 1 – CAH	GB Payment Cohort 1 – CAH	FFS Payment Cohort 1 – PPS	GB Payment Cohort 1 – PPS
2019 – biweek 23	$ 157,440.0	$ 193,395.3	$ 607,940.1	$ 562,677.3
2019 – biweek 24	$ 140,761.5	$ 193,395.3	$ 456,479.7	$ 562,677.3
2019 – biweek 25	$ 193,512.2	$ 193,395.3	$ 569,986.4	$ 562,677.3
2019 – biweek 26	$ 163,257.4	$ 193,395.3	$ 490,579.5	$ 562,677.3
2020 – biweek 1	$ 187,325.0	$ 169,761.0	$ 500,878.9	$ 636,306.3
2020 – biweek 2	$ 151,212.0	$ 169,761.0	$ 445,286.7	$ 636,306.3
2020 – biweek 3	$ 182,069.0	$ 169,761.0	$ 464,617.3	$ 636,306.3
2020 – biweek 4	$ 156,974.4	$ 169,761.0	$ 482,237.4	$ 636,306.3
2020 – biweek 5	$ 153,160.3	$ 169,761.0	$ 525,956.8	$ 636,306.3
2020 – biweek 6	$ 144,041.9	$ 169,761.0	$ 446,219.5	$ 636,306.3
2020 – biweek 7	$ 112,423.5	$ 169,761.0	$ 321,246.6	$ 636,306.3
2020 – biweek 8	$ 106,896.1	$ 169,761.0	$ 382,394.2	$ 636,306.3
2020 – biweek 9	$ 154,842.9	$ 169,761.0	$ 361,569.5	$ 636,306.3
2020 – biweek 10	$ 156,280.8	$ 169,761.0	$ 363,443.4	$ 636,306.3
2020 – biweek 11	$ 114,916.6	$ 169,761.0	$ 424,789.0	$ 636,306.3
2020 – biweek 12	$ 191,353.5	$ 169,761.0	$ 487,348.6	$ 636,306.3
2020 – biweek 13	$ 181,750.7	$ 169,761.0	$ 534,395.4	$ 636,306.3
2020 – biweek 14	$ 141,780.0	$ 169,761.0	$ 562,894.9	$ 636,306.3
2020 – biweek 15	$ 163,957.1	$ 169,761.0	$ 561,572.8	$ 636,306.3
2020 – biweek 16	$ 189,825.5	$ 169,761.0	$ 503,263.6	$ 636,306.3
2020 – biweek 17	$ 180,668.3	$ 169,761.0	$ 501,027.3	$ 636,306.3
2020 – biweek 18	$ 126,349.0	$ 169,761.0	$ 426,010.8	$ 636,306.3
2020 – biweek 19	$ 162,413.2	$ 169,761.0	$ 527,291.1	$ 636,306.3

Time Period	FFS Payment Cohort 1 – CAH	GB Payment Cohort 1 – CAH	FFS Payment Cohort 1 – PPS	GB Payment Cohort 1 – PPS
2020 – biweek 20	$ 205,666.3	$ 169,761.0	$ 516,770.8	$ 636,306.3
2020 – biweek 21	$ 138,716.5	$ 169,761.0	$ 524,426.4	$ 636,306.3
2020 – biweek 22	$ 167,933.6	$ 169,761.0	$ 489,797.9	$ 636,306.3
2020 – biweek 23	$ 152,671.7	$ 169,761.0	$ 544,744.1	$ 636,306.3
2020 – biweek 24	$ 187,892.7	$ 169,761.0	$ 439,189.9	$ 636,306.3
2020 – biweek 25	$ 216,321.8	$ 169,761.0	$ 586,369.2	$ 636,306.3
2020 – biweek 26	$ 181,058.1	$ 169,761.0	$ 545,314.8	$ 636,306.3
2021 – biweek 1	$ 136,198.0	$ 172,002.4	$ 504,642.3	$ 600,327.7
2021 – biweek 2	$ 130,680.2	$ 172,002.4	$ 504,780.3	$ 600,327.7
2021 – biweek 3	$ 158,443.1	$ 172,002.4	$ 432,194.8	$ 600,327.7
2021 – biweek 4	$ 133,674.8	$ 172,002.4	$ 434,272.3	$ 600,327.7
2021 – biweek 5	$ 211,829.1	$ 172,002.4	$ 463,430.2	$ 600,327.7
2021 – biweek 6	$ 156,432.9	$ 172,002.4	$ 425,085.7	$ 600,327.7
2021 – biweek 7	$ 157,003.5	$ 172,002.4	$ 450,949.5	$ 600,327.7
2021 – biweek 8	$ 190,649.2	$ 172,002.4	$ 533,948.4	$ 600,327.7
2021 – biweek 9	$ 129,871.1	$ 172,002.4	$ 453,830.2	$ 600,327.7
2021 – biweek 10	$ 152,469.5	$ 172,002.4	$ 501,720.8	$ 600,327.7
2021 – biweek 11	$ 123,282.7	$ 172,002.4	$ 445,119.6	$ 600,327.7
2021 – biweek 12	$ 162,519.1	$ 172,002.4	$ 462,626.5	$ 600,327.7
2021 – biweek 13	$ 152,679.9	$ 172,002.4	$ 485,782.6	$ 600,327.7
2021 – biweek 14	$ 165,156.4	$ 172,002.4	$ 499,818.7	$ 600,327.7
2021 – biweek 15	$ 151,653.7	$ 172,002.4	$ 394,185.4	$ 600,327.7
2021 – biweek 16	$ 139,087.9	$ 172,002.4	$ 469,947.1	$ 600,327.7

Time Period	FFS Payment Cohort 1 – CAH	GB Payment Cohort 1 – CAH	FFS Payment Cohort 1 – PPS	GB Payment Cohort 1 – PPS
2021 – biweek 17	$ 176,661.4	$ 172,002.4	$ 475,543.5	$ 600,327.7
2021 – biweek 18	$ 150,888.5	$ 172,002.4	$ 548,137.1	$ 600,327.7
2021 – biweek 19	$ 160,621.7	$ 172,002.4	$ 446,595.1	$ 600,327.7
2021 – biweek 20	$ 216,268.0	$ 172,002.4	$ 551,083.6	$ 600,327.7
2021 – biweek 21	$ 194,499.3	$ 172,002.4	$ 582,622.6	$ 600,327.7
2021 – biweek 22	$ 209,259.6	$ 172,002.4	$ 633,570.2	$ 600,327.7
2021 – biweek 23	$ 206,833.6	$ 172,002.4	$ 605,811.2	$ 600,327.7
2021 – biweek 24	$ 189,551.3	$ 172,002.4	$ 547,605.2	$ 600,327.7
2021 – biweek 25	$ 207,163.3	$ 172,002.4	$ 515,286.8	$ 600,327.7
2021 – biweek 26	$ 192,806.5	$ 172,002.4	$ 561,989.0	$ 600,327.7
2022 – biweek 1	$ 191,360.4	$ 154,064.2	$ 574,610.5	$ 618,856.5
2022 – biweek 2	$ 166,095.9	$ 154,064.2	$ 482,348.3	$ 618,856.5
2022 – biweek 3	$ 134,423.5	$ 154,064.2	$ 488,564.9	$ 618,856.5
2022 – biweek 4	$ 176,578.5	$ 154,064.2	$ 451,485.0	$ 618,856.5
2022 – biweek 5	$ 188,615.0	$ 154,064.2	$ 525,018.2	$ 618,856.5
2022 – biweek 6	$ 187,766.4	$ 154,064.2	$ 473,771.7	$ 618,856.5
2022 – biweek 7	$ 149,103.2	$ 154,064.2	$ 528,887.1	$ 618,856.5
2022 – biweek 8	$ 229,157.6	$ 154,064.2	$ 384,458.4	$ 618,856.5
2022 – biweek 9	$ 182,594.6	$ 154,064.2	$ 500,438.5	$ 618,856.5
2022 – biweek 10	$ 177,553.7	$ 154,064.2	$ 463,378.8	$ 618,856.5
2022 – biweek 11	$ 216,210.7	$ 154,064.2	$ 399,813.9	$ 618,856.5
2022 – biweek 12	$ 150,339.9	$ 154,064.2	$ 484,746.4	$ 618,856.5
2022 – biweek 13	$ 122,400.9	$ 154,064.2	$ 522,030.6	$ 618,856.5

Time Period	FFS Payment Cohort 1 – CAH	GB Payment Cohort 1 – CAH	FFS Payment Cohort 1 – PPS	GB Payment Cohort 1 – PPS
2022 – biweek 14	$ 188,573.7	$ 154,064.2	$ 346,716.6	$ 618,856.5
2022 – biweek 15	$ 126,966.7	$ 154,064.2	$ 422,182.2	$ 618,856.5
2022 – biweek 16	$ 170,076.2	$ 154,064.2	$ 401,595.0	$ 618,856.5
2022 – biweek 17	$ 195,090.3	$ 154,064.2	$ 508,740.3	$ 618,856.5
2022 – biweek 18	$ 177,743.6	$ 154,064.2	$ 416,391.9	$ 618,856.5
2022 – biweek 19	$ 164,136.4	$ 154,064.2	$ 401,085.0	$ 618,856.5
2022 – biweek 20	$ 182,873.0	$ 154,064.2	$ 457,311.0	$ 618,856.5
2022 – biweek 21	$ 163,380.6	$ 154,064.2	$ 375,939.1	$ 618,856.5
2022 – biweek 22	$ 184,704.6	$ 154,064.2	$ 513,050.5	$ 618,856.5
2022 – biweek 23	$ 177,110.2	$ 154,064.2	$ 467,808.1	$ 618,856.5
2022 – biweek 24	$ 169,072.9	$ 154,064.2	$ 453,862.9	$ 618,856.5
2022 – biweek 25	$ 156,871.0	$ 154,064.2	$ 495,345.8	$ 618,856.5
2022 – biweek 26	$ 127,990.5	$ 154,064.2	$ 322,483.5	$ 618,856.5

Appendix Exhibit C.5. Biweekly Fee for Service Revenue and Global Budget Payments for Participating Hospitals – Cohort 2

Time Period	FFS Payment Cohort 2 - CAH	GB Payment Cohort 2 - CAH	FFS Payment Cohort 2 - PPS	GB Payment Cohort 2 - PPS
2020 – biweek 1	$ 124,848.7	$ 250,507.2	$ 428,811.5	$ 526,146.6
2020 – biweek 2	$ 129,179.5	$ 250,507.2	$ 456,264.9	$ 526,146.6
2020 – biweek 3	$ 146,898.2	$ 250,507.2	$ 444,492.6	$ 526,146.6
2020 – biweek 4	$ 152,947.4	$ 250,507.2	$ 448,395.9	$ 526,146.6
2020 – biweek 5	$ 192,047.3	$ 250,507.2	$ 408,168.4	$ 526,146.6
2020 – biweek 6	$ 131,970.5	$ 250,507.2	$ 349,831.2	$ 526,146.6
2020 – biweek 7	$ 72,339.2	$ 250,507.2	$ 299,945.3	$ 526,146.6

Time Period	FFS Payment Cohort 2 - CAH	GB Payment Cohort 2 - CAH	FFS Payment Cohort 2 - PPS	GB Payment Cohort 2 - PPS
2020 – biweek 8	$ 133,890.9	$ 250,507.2	$ 241,323.5	$ 526,146.6
2020 – biweek 9	$ 153,906.2	$ 250,507.2	$ 288,061.8	$ 526,146.6
2020 – biweek 10	$ 120,732.0	$ 250,507.2	$ 326,523.3	$ 526,146.6
2020 – biweek 11	$ 148,704.7	$ 250,507.2	$ 331,125.5	$ 526,146.6
2020 – biweek 12	$ 130,310.0	$ 250,507.2	$ 388,397.8	$ 526,146.6
2020 – biweek 13	$ 166,122.8	$ 250,507.2	$ 365,121.2	$ 526,146.6
2020 – biweek 14	$ 154,548.9	$ 250,507.2	$ 383,133.4	$ 526,146.6
2020 – biweek 15	$ 139,923.3	$ 250,507.2	$ 404,650.8	$ 526,146.6
2020 – biweek 16	$ 123,605.3	$ 250,507.2	$ 388,758.7	$ 526,146.6
2020 – biweek 17	$ 133,955.8	$ 250,507.2	$ 373,729.8	$ 526,146.6
2020 – biweek 18	$ 140,117.0	$ 250,507.2	$ 422,394.2	$ 526,146.6
2020 – biweek 19	$ 166,519.7	$ 250,507.2	$ 398,311.6	$ 526,146.6
2020 – biweek 20	$ 160,610.1	$ 250,507.2	$ 423,515.1	$ 526,146.6
2020 – biweek 21	$ 154,625.5	$ 250,507.2	$ 403,627.3	$ 526,146.6
2020 – biweek 22	$ 159,323.3	$ 250,507.2	$ 489,413.3	$ 526,146.6
2020 – biweek 23	$ 128,290.5	$ 250,507.2	$ 493,595.9	$ 526,146.6
2020 – biweek 24	$ 113,846.4	$ 250,507.2	$ 479,459.3	$ 526,146.6
2020 – biweek 25	$ 192,427.6	$ 250,507.2	$ 580,721.0	$ 526,146.6
2020 – biweek 26	$ 224,318.8	$ 250,507.2	$ 490,910.0	$ 526,146.6
2021 – biweek 1	$ 126,885.0	$ 175,842.4	$ 420,977.7	$ 547,219.7
2021 – biweek 2	$ 118,160.8	$ 175,842.4	$ 439,366.1	$ 547,219.7
2021 – biweek 3	$ 150,459.3	$ 175,842.4	$ 400,737.1	$ 547,219.7
2021 – biweek 4	$ 141,391.9	$ 175,842.4	$ 407,591.7	$ 547,219.7

Time Period	FFS Payment Cohort 2 - CAH	GB Payment Cohort 2 - CAH	FFS Payment Cohort 2 - PPS	GB Payment Cohort 2 - PPS
2021 – biweek 5	$ 189,101.6	$ 175,842.4	$ 452,736.8	$ 547,219.7
2021 – biweek 6	$ 196,567.2	$ 175,842.4	$ 393,937.8	$ 547,219.7
2021 – biweek 7	$ 154,859.8	$ 175,842.4	$ 391,008.2	$ 547,219.7
2021 – biweek 8	$ 154,499.4	$ 175,842.4	$ 375,250.4	$ 547,219.7
2021 – biweek 9	$ 204,705.0	$ 175,842.4	$ 430,176.0	$ 547,219.7
2021 – biweek 10	$ 176,204.1	$ 175,842.4	$ 436,813.2	$ 547,219.7
2021 – biweek 11	$ 256,529.0	$ 175,842.4	$ 395,779.6	$ 547,219.7
2021 – biweek 12	$ 122,350.5	$ 175,842.4	$ 429,327.4	$ 547,219.7
2021 – biweek 13	$ 119,289.7	$ 175,842.4	$ 389,753.9	$ 547,219.7
2021 – biweek 14	$ 150,045.7	$ 175,842.4	$ 399,342.7	$ 547,219.7
2021 – biweek 15	$ 133,921.3	$ 175,842.4	$ 401,743.6	$ 547,219.7
2021 – biweek 16	$ 173,193.1	$ 175,842.4	$ 418,238.3	$ 547,219.7
2021 – biweek 17	$ 216,298.9	$ 175,842.4	$ 437,178.7	$ 547,219.7
2021 – biweek 18	$ 224,538.8	$ 175,842.4	$ 373,392.8	$ 547,219.7
2021 – biweek 19	$ 251,547.9	$ 175,842.4	$ 415,173.8	$ 547,219.7
2021 – biweek 20	$ 221,326.2	$ 175,842.4	$ 504,076.1	$ 547,219.7
2021 – biweek 21	$ 155,861.9	$ 175,842.4	$ 408,617.1	$ 547,219.7
2021 – biweek 22	$ 206,167.8	$ 175,842.4	$ 427,860.4	$ 547,219.7
2021 – biweek 23	$ 242,802.1	$ 175,842.4	$ 534,829.2	$ 547,219.7
2021 – biweek 24	$ 166,246.8	$ 175,842.4	$ 459,895.8	$ 547,219.7
2021 – biweek 25	$ 246,966.2	$ 175,842.4	$ 514,328.5	$ 547,219.7
2021 – biweek 26	$ 186,015.5	$ 175,842.4	$ 423,328.5	$ 547,219.7
2022 – biweek 1	$ 152,670.9	$ 105,953.5	$ 430,412.7	$ 512,309.1

Time Period	FFS Payment Cohort 2 - CAH	GB Payment Cohort 2 - CAH	FFS Payment Cohort 2 - PPS	GB Payment Cohort 2 - PPS
2022 – biweek 2	$ 184,513.9	$ 105,953.5	$ 428,635.8	$ 512,309.1
2022 – biweek 3	$ 186,935.6	$ 105,953.5	$ 405,289.4	$ 512,309.1
2022 – biweek 4	$ 151,294.5	$ 105,953.5	$ 385,232.0	$ 512,309.1
2022 – biweek 5	$ 118,601.8	$ 105,953.5	$ 347,033.8	$ 512,309.1
2022 – biweek 6	$ 153,961.2	$ 105,953.5	$ 350,647.1	$ 512,309.1
2022 – biweek 7	$ 110,189.6	$ 105,953.5	$ 431,405.2	$ 512,309.1
2022 – biweek 8	$ 135,952.7	$ 105,953.5	$ 388,023.9	$ 512,309.1
2022 – biweek 9	$ 132,822.5	$ 105,953.5	$ 370,390.0	$ 512,309.1
2022 – biweek 10	$ 150,745.1	$ 105,953.5	$ 340,503.4	$ 512,309.1
2022 – biweek 11	$ 126,330.0	$ 105,953.5	$ 372,568.7	$ 512,309.1
2022 – biweek 12	$ 136,744.0	$ 105,953.5	$ 332,129.7	$ 512,309.1
2022 – biweek 13	$ 137,629.0	$ 105,953.5	$ 405,284.6	$ 512,309.1
2022 – biweek 14	$ 141,440.5	$ 105,953.5	$ 379,741.4	$ 512,309.1
2022 – biweek 15	$ 159,557.9	$ 105,953.5	$ 346,975.8	$ 512,309.1
2022 – biweek 16	$ 116,074.9	$ 105,953.5	$ 425,909.9	$ 512,309.1
2022 – biweek 17	$ 255,911.6	$ 105,953.5	$ 364,796.1	$ 512,309.1
2022 – biweek 18	$ 189,853.5	$ 105,953.5	$ 354,737.6	$ 512,309.1
2022 – biweek 19	$ 137,012.8	$ 105,953.5	$ 393,467.7	$ 512,309.1
2022 – biweek 20	$ 216,276.9	$ 105,953.5	$ 421,007.9	$ 512,309.1
2022 – biweek 21	$ 201,550.1	$ 105,953.5	$ 375,076.0	$ 512,309.1
2022 – biweek 22	$ 129,618.9	$ 105,953.5	$ 413,158.4	$ 512,309.1
2022 – biweek 23	$ 168,334.8	$ 105,953.5	$ 412,466.2	$ 512,309.1
2022 – biweek 24	$ 184,083.5	$ 105,953.5	$ 345,062.4	$ 512,309.1

Time Period	FFS Payment Cohort 2 - CAH	GB Payment Cohort 2 - CAH	FFS Payment Cohort 2 - PPS	GB Payment Cohort 2 - PPS
2022 – biweek 25	$ 124,581.8	$ 105,953.5	$ 386,556.9	$ 512,309.1
2022 – biweek 26	$ 136,462.1	$ 105,953.5	$ 247,272.1	$ 512,309.1

Appendix Exhibit C.6. Biweekly Fee for Service Revenue and Global Budget Payments for Participating Hospitals – Cohort 3

Time Period	FFS Payment Cohort 3 - PPS	GB Payment Cohort 3 - PPS
2021 – biweek 1	$755,393.58	$827,643.74
2021 – biweek 2	$662,160.63	$827,643.74
2021 – biweek 3	$682,150.93	$827,643.74
2021 – biweek 4	$738,829.20	$827,643.74
2021 – biweek 5	$679,684.65	$827,643.74
2021 – biweek 6	$743,651.55	$827,643.74
2021 – biweek 7	$773,480.49	$827,643.74
2021 – biweek 8	$726,926.82	$827,643.74
2021 – biweek 9	$754,160.24	$827,643.74
2021 – biweek 10	$729,732.79	$827,643.74
2021 – biweek 11	$687,898.41	$827,643.74
2021 – biweek 12	$804,353.23	$827,643.74
2021 – biweek 13	$746,902.69	$827,643.74
2021 – biweek 14	$670,088.32	$827,643.74
2021 – biweek 15	$706,295.39	$827,643.74
2021 – biweek 16	$698,595.70	$827,643.74
2021 – biweek 17	$719,433.62	$827,643.74
2021 – biweek 18	$710,721.62	$827,643.74
2021 – biweek 19	$813,952.19	$827,643.74

Time Period	FFS Payment Cohort 3 - PPS	GB Payment Cohort 3 - PPS
2021 – biweek 20	$821,421.65	$827,643.74
2021 – biweek 21	$811,452.51	$827,643.74
2021 – biweek 22	$858,367.40	$827,643.74
2021 – biweek 23	$858,715.64	$827,643.74
2021 – biweek 24	$840,528.20	$827,643.74
2021 – biweek 25	$783,713.74	$827,643.74
2021 – biweek 26	$643,365.42	$827,643.74
2022 – biweek 1	$767,916.33	$822,976.43
2022 – biweek 2	$733,960.71	$822,976.43
2022 – biweek 3	$702,462.42	$822,976.43
2022 – biweek 4	$735,318.44	$822,976.43
2022 – biweek 5	$733,737.09	$822,976.43
2022 – biweek 6	$724,847.19	$822,976.43
2022 – biweek 7	$623,638.58	$822,976.43
2022 – biweek 8	$642,892.20	$822,976.43
2022 – biweek 9	$707,329.88	$822,976.43
2022 – biweek 10	$707,473.19	$822,976.43
2022 – biweek 11	$667,839.95	$822,976.43
2022 – biweek 12	$711,141.25	$822,976.43
2022 – biweek 13	$712,141.37	$822,976.43
2022 – biweek 14	$716,038.25	$822,976.43
2022 – biweek 15	$655,352.04	$822,976.43
2022 – biweek 16	$769,514.37	$822,976.43
2022 – biweek 17	$720,064.79	$822,976.43
2022 – biweek 18	$752,679.88	$822,976.43

Time Period	FFS Payment Cohort 3 - PPS	GB Payment Cohort 3 - PPS
2022 – biweek 19	$760,148.17	$822,976.43
2022 – biweek 20	$739,126.67	$822,976.43
2022 – biweek 21	$697,857.58	$822,976.43
2022 – biweek 22	$705,512.39	$822,976.43
2022 – biweek 23	$715,859.74	$822,976.43
2022 – biweek 24	$647,181.24	$822,976.43
2022 – biweek 25	$699,224.67	$822,976.43
2022 – biweek 26	$508,265.99	$822,976.43

Appendix Exhibit C.7. Entries and Exits of Clinicians in Participating Hospitals

Hospital Group	2016	2017	2018	2019	2020	2021	2022
CAH – New (all)	-	95	120	91	83	130	92
CAH – Exit (all)	-	133	114	119	122	103	132
CAH – Total (all)	429	391	397	369	330	357	317
PPS – New (all)	-	460	496	484	448	479	539
PPS – Exit (all)	-	460	484	495	535	452	520
PPS – Total (all)	2098	2098	2110	2099	2012	2039	2058
CAH – New (MD/DO)	-	74	86	70	67	115	77
CAH – Exit (MD/DO)	-	114	95	94	93	69	111
CAH – Total (MD/DO)	356	316	307	283	257	303	269
PPS – New (MD/DO)	-	383	388	371	358	358	392
PPS – Exit (MD/DO)	-	402	442	442	442	77	417
PPS – Total (MD/DO)	1845	1826	1772	1701	1617	1598	1573
CAH – New (APP)	-	20	33	20	15	15	14
CAH – Exit (APP)	-	17	19	25	29	34	18
CAH – Total (APP)	68	71	85	80	66	47	43
PPS – New (APP)	-	70	104	108	89	118	140
PPS – Exit (APP)	-	51	34	48	85	71	98
PPS – Total (APP)	223	242	312	372	376	423	465
CAH – New (PCP)	-	34	25	27	26	44	26
CAH – Exit (PCP)	-	47	42	34	25	25	47
CAH – Total (PCP)	144	131	114	107	108	127	106
PPS – New (PCP)	-	145	168	151	132	130	158
PPS – Exit (PCP)	-	187	171	177	187	153	153
PPS – Total (PCP)	835	793	790	764	709	686	691

DEFINITIONS: New = clinicians listed on at least 12 claims in the current year, but listed on fewer than 12 claims in the prior year. Exit = clinicians listed on at least 12 claims in the prior year, but fewer than 12 claim sin the current year. APP = Advanced Practice Providers. MD/DO = Medical doctors and Doctors of Osteopathic Medicine

Appendix Exhibit C.8. HHI and Market Share in Participating Hospital Market Areas

Market	HHI - 2019	Market Share – 2019	HHI - 2022	Market Share - 2022
Hospital 1	4,397	64%	3,297	52%
Hospital 2	5,019	66%	5,114	66%
Hospital 3	2,523	9%	2,748	12%
Hospital 4	5,196	5%	4,850	5%
Hospital 5	6,885	81%	7,888	88%
Hospital 6	3,958	42%	4,025	26%
Hospital 7	9,802	99%	9,803	99%
Hospital 8	4,346	41%	4,325	33%
Hospital 9	9,802	99%	10,000	100%
Hospital 10	3,152	14%	2,963	15%
Hospital 11	5,788	74%	5,684	73%
Hospital 12	4,590	7%	4,567	6%
Hospital 13	7,169	7%	7,509	8%
Hospital 14	8,142	5%	7,638	7%
Hospital 15	9,802	99%	9,038	95%
Hospital 16	3,586	43%	3,496	34%
Hospital 17	5,576	2%	5,280	3%
Hospital 18	4,898	12%	4,862	14%

DEFINITIONS: HHI = Herfindal-Hirschman index (the U.S. Department of Justice Antitrust Division defines an HHI between 1,000 – 1,800 as moderately concentrated, and HHI above 1,800 to be highly concentrated)[5]

Appendix Exhibit C.9. Prevalence of Chronic Conditions in Participating Hospital Market Areas – Medicaid/CHIP Population

Condition	2017	2018	2019	2020	2021
Alcohol Use Disorders	1.8%	1.7%	1.7%	1.8%	2.0%
Depressive Disorders	6.9%	6.7%	7.0%	7.3%	8.6%
Opioid Use Disorders	2.4%	2.3%	2.5%	2.6%	3.1%
Anxiety Disorders	7.7%	7.7%	8.3%	9.2%	11.3%
Drug Use Disorders	4.0%	3.9%	4.2%	4.3%	5.0%
Tobacco Use Disorders	5.6%	5.4%	5.4%	5.5%	6.1%

SOURCE: 2017-2021 T-MSIS Analytic Files
NOTES: Presence of chronic conditions are defined based onsets of diagnoses and procedures published on the CMS Chronic Condition Warehouse[c]

Appendix Exhibit C.10. MAT Adherence (%)

Market	2017	2018	2019	2020	2021
Participant	26.5%	29.1%	22.9%	23.6%	18.1%
ENP	27.7%	29.3%	21.9%	23.1%	17.2%
FORHP	23.3%	25.2%	22.4%	23.0%	16.6%
NCQA Benchmark	-	-	-	30.40%	30.40%
Participants with Transformation Goals Related to Increasing Access to MAT	21.2%	24.3%	22.7%	24.0%	20.9%

DEFINITIONS: Participant = Participating Hospital Market Areas (has ever participated in the model). Eligible Non-Participant = Eligible Non-participating Hospital Market Areas (never participated in the model). FORHP = Areas in Pennsylvania deemed rural by the Federal Office of Rural Health Policy

Appendix Exhibit C.11. 7 and 30 Day Follow Up for SUD-Related ED Discharges (NQF # 3488)

Market	2016	2017	2018	2019	2020	2021
Participant – 7 day	14.4%	17.0%	18.1%	19.3%	19.0%	16.9%
ENP– 7 day	14.0%	15.6%	16.9%	18.2%	18.1%	16.9%

[c] https://www2.ccwdata.org/web/guest/condition-categories

Market	2016	2017	2018	2019	2020	2021
FORHP– 7 day	14.6%	15.2%	14.5%	15.3%	16.6%	14.8%
NCQA Benchmark– 7 day	-	-	13.0%	13.3%	13.8%	13.4%
Participants with Transformation Goals Related to Improving Access to Care for SUD – 7 day	14.8%	17.4%	18.6%	16.9%	117.1%	14.9%
Participant – 30 day	23.9%	25.9%	27.7%	30.3%	30.2%	27.3%
ENP– 30 day	22.3%	24.1%	26.6%	28.8%	28.7%	27.0%
FORHP– 30 day	22.4%	24.5%	23.5%	25.0%	27.9%	24.5%
NCQA Benchmark– 30 day	-	-	19.2%	19.6%	20.2%	19.8%
Participants with Transformation Goals Related to Improving Access to Care for SUD – 30 day	24.5%	27.1%	27.1%	26.4%	27.7%	25.6%

DEFINITIONS: Participant = Participating Hospital Market Areas (has ever participated in the model). Eligible Non-Participant = Eligible Non-participating Hospital Market Areas (never participated in the model). FORHP = Areas in Pennsylvania deemed rural by the Federal Office of Rural Health Policy

Appendix Exhibit C.12. 7 Day and 30 Day Follow Up for Mental Illness-Related ED Discharges (NQF # 3489)

Market	2016	2017	2018	2019	2020	2021
Participant – 7 day	37.3%	38.1%	37.9%	39.3%	34.6%	33.5%
ENP– 7 day	36.1%	36.4%	38.2%	38.0%	34.7%	35.4%
FORHP– 7 day	33.3%	35.3%	36.1%	36.2%	34.2%	34.6%
NCQA Benchmark– 7 day	-	-	40.3%	41.4%	40.4%	40.1%
Participants with Transformation Goals Related to Mental Illness – 7 day	39.3%	40.7%	40.3%	47.2%	43.6%	40.0%
Participant – 30 day	56.7%	57.3%	57.1%	59.4%	54.5%	54.0%
ENP– 30 day	55.9%	55.5%	57.6%	57.5%	53.5%	54.6%
FORHP– 30 day	53.3%	54.8%	55.8%	56.6%	54.0%	55.5%

Market	2016	2017	2018	2019	2020	2021
NCQA Benchmark– 30 day	-	-	54.8%	55.6%	54.4%	53.4%
Participants with Transformation Goals Related to Mental Illness – 30 day	58.8%	57.8%	57.6%	65.8%	59.7%	57.3%

DEFINITIONS: Participant = Participating Hospital Market Areas (has ever participated in the model). Eligible Non-Participant = Eligible Non-participating Hospital Market Areas (never participated in the model). FORHP = Areas in Pennsylvania deemed rural by the Federal Office of Rural Health Policy

Appendix Exhibit C.13. 7 Day and 30 Day Follow Up for Mental Illness-Related Inpatient Stays (NQF # 0576)

Market	2016	2017	2018	2019	2020	2021
Participant – 7 day	-	-	-	37.78%	40.26%	40.32%
ENP– 7 day	-	-	-	35.82%	39.49%	39.25%
FORHP– 7 day	-	-	-	37.20%	40.48%	40.18%
NCQA Benchmark– 7 day	-	-	-	36.20%	39.40%	38.40%
Participants with Transformation Goals Related to Mental Illness – 7 day	-	-	-	35.24%	36.56%	36.74%
Participant – 30 day	-	-	-	61.30%	62.70%	62.32%
ENP– 30 day	-	-	-	58.11%	61.30%	61.06%
FORHP– 30 day	-	-	-	60.78%	62.99%	62.41%
NCQA Benchmark– 30 day	-	-	-	56.90%	58.90%	58.70%
Participants with Transformation Goals Related to Mental Illness – 30 day	-	-	-	56.78%	61.55%	61.01%

DEFINITIONS: Participant = Participating Hospital Market Areas (has ever participated in the model). Eligible Non-Participant = Eligible Non-participating Hospital Market Areas (never participated in the model). FORHP = Areas in Pennsylvania deemed rural by the Federal Office of Rural Health Policy

Appendix Exhibit C.14: PARHM Hospitals Participation in MSSP ACOs During the Model Period

PARHM Hospitals	Bridges Health Partners ACO	Caravan ACO	Physician Partners of Western PA ACO	Keystone ACO	Pennsylvania 2018 ACO	Advantage Point Health Alliance ACO
Armstrong County Memorial Hospital			X			
Chan Soon-Shiong Medical Center at Windber						X
Clarion Hospital	X					
Geisinger Jersey Shore				X		
Highlands Hospital			X			
Meadville Medical Center		X				
Tyrone					X	
Washington Hospital	X					
Wayne Memorial				X		

SOURCE: CMS.gov: https://data.cms.gov/medicare-shared-savings-program/accountable-care-organization-participants (files from 2019-2023)

Appendix Exhibit C.15: Demographic Characteristics in the FFS PARHM-only Group and the FFS PARHM-MSSP Group

Race	FFS PARHM-only (n=102,614)	FFS PARHM-MSSP (n=74,462)
Non-Hispanic White	95.1%	95.3%
Unknown	1.6%	1.6%
Black (Or African-American)	1.6%	1.6%
Hispanic	0.8%	0.9%
Asian/Pacific Islander	0.4%	0.4%
Other	0.3%	0.2%
American Indian / Alaska Native	0.2%	0.0%

Sex	FFS PARHM-only (n=102614)	FFS PARHM-MSSP (n=74462)
Female	51.9%	55.0%
Male	48.1%	45.0%

Age	FFS PARHM-only (n=102614)	FFS PARHM-MSSP (n=74462)
Average Age	69.5	71.0

SOURCE: Medicare Beneficiary Files Medicare Master Data Demonstration Files, PARHM Project Files
NOTES: Average age was calculated using the age of the patient in the year they first appeared in their group.
DEFINITIONS: FFS PARHM-only: Patients living in the market area of a PARHM PPS hospitals who are not aligned to an MSSP ACO; PARHM-MSSP: Patients living in the market area of a PARHM PPS hospital while being aligned to an MSSP ACO.

Appendix D. Global Budget Adjustments

The global budget's methodology contains 11 different forms of adjustments (**Exhibit 2.1**) that modify the prospective global budget for the next year and are used to reconcile the global budget against actual utilization at the end of the budget year. The following appendix describes the methodology for each of these adjustments.[6]

Prospective Global Budget Adjustments

Unit Price Adjustment - Unit price adjustment methodology will differ by payers and line of business, requiring a customized approach. However, for Medicare FFS, the adjustment follows the methodology used under the ordinary inpatient and outpatient prospective payment system's price adjustment:

- Unit price trend: For historical factors, year-on-year unit cost change for Medicare FFS, incorporating change in market basket and any legislated productivity improvement, as published by the CMS Office of the Actuary (https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/FFS-Trends.html).
- Change in geographic adjustment factor: Year-on-year change in geographic adjustment factors based on the wage index for the geographic area in which the hospital is located (https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/wageindex.html). The annual growth rate from the prior year is used to adjust the prospective budget. The similar capital adjustment factor is also used to adjust the capital component of inpatient spending.
- Performance in hospital quality of care programs: The year-on-year unit cost change for Medicare FFS, incorporating provider-specific quality of care adjustment factors, as published by CMS. Adjustment factors are applied to inpatient acute care payment amounts, excluding capital payment amounts and low-volume payment amounts. Unit cost is adjusted based on performance in 5 programs:
- Hospital Value-Based Purchasing (VBP) Program: The year-on-year change in value-based incentive payment adjustment factor is used to adjust the labor and non-labor portion of paid amounts of inpatient claims. CMS publishes the relevant factors to be used for a given year (https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/Hospital-Value-Based-Purchasing-.html).
- Hospital Readmission Reduction Program (HRRP): The year-on-year change in readmissions adjustment factor is used to adjust the labor and non-labor portion of paid amounts of inpatient claims. CMS publishes the relevant factors to be used for a given year (https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html).
- Hospital-Acquired Condition (HAC) Reduction Program: The year-on-year change in HAC score (Total HAC score greater than the 75th percentile of all Total HAC scores will be subject to a 1% payment reduction) is used to adjust the labor and non-labor portion of paid amounts of inpatient claims. CMS publishes the

relevant factors to be used for a given year. (https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html).

- Hospital Inpatient Quality Reporting (IQR) Program: The year-on-year change in market basket, as published by the CMS Office of the Actuary is used to adjust the labor, non-labor, and capital portion of paid amounts of inpatient claims. (https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalRHQDAPU.html).
- Hospital Outpatient Quality Reporting (OQR) Program: The year-on-year change in market basket, as published by the CMS Office of the Actuary is used to adjust the labor and non-labor portion of paid amounts of outpatient claims. (https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalOutpatientQualityReportingProgram.html).

For CAHs, the unit price adjustment will be calculated the same as for PPS for those components that are applicable to the CAH for the initial baseline budgets. For subsequent years, the unit price adjustment factor will be the percentage change in each hospital's interim rates based on the hospital's most recent Medicare Interim Reimbursement. If a hospital submits an interim Medicare cost report that would result in mid-year changes to its payment rates outside of the global budget model, the global budget will be updated mid-year to reflect the changes in cost-based reimbursement, following the same timing for interim rate updates as would have occurred outside of the global budget model.

For commercial payers, unit price adjustment will utilize the year-on-year rate increases set between each individual payer and the participating hospital (e.g., based on rate escalators in existing contracts). For mid-year unit price adjustments, it is anticipated a prorated approach will be utilized.

PAU Adjustment – PAU under the model focuses on three key metrics:

- Avoidable ED Utilization as measured by the NYU algorithm
- Ambulatory Care Sensitive Hospitalizations as measured by AHRQ's PQI-90
- 30 day all cause readmissions, only considering readmission to the same facility

The RHRC, in collaboration with hospital stakeholders, sets hospitals' PAU opportunity target, defined as the NPR associated with a target reduction in PAU from readmissions, PQIs, and avoidable ED visits. Setting the PAU reduction targets requires three elements:

- Define PAU savings opportunity (PAU rate). PAU savings opportunity is the percent revenue in NPR associated with PAU. Specifically, a hospital's inpatient PAU savings opportunity is calculated as the revenue share of hospital admissions for PQI 90 measure and 30-day readmissions in total inpatient revenue, and its ED PAU savings opportunity is calculated as the revenue share of potentially avoidable ED visits in total ED revenue. Hospitals with fewer than 30 inpatient or ED cases will not receive an inpatient or ED PAU reduction adjustment. For commercial payers, the PAU rates and calculations are performed at the line of business level.

- Identify a peer group for benchmarking. For Medicare FFS global budgets, the peer-group includes all rural acute IPPS hospitals eligible for the Model, based on rural county locations defined by the Center for Rural Pennsylvania. Hospitals that specialize in certain surgical procedures or were not in operation for the full period of 2016-2018 are excluded from the peer group. Based on these criteria, a total of 51 rural hospitals are included in the Medicare FFS peer-group.
  - For commercial payers, benchmark pools (i.e., peer groups) are established using baseline unplanned volume shift data submissions for cohort 1 and cohort 2 hospitals with 6-month claims run-out. This data includes PAU rates of all catchment areas. Benchmark pools are established for each line of business and PAU measure separately. There are six benchmark pools based on two PAU rates (inpatient and ED) calculated across three lines of business (commercial, Medicaid, and Medicare).
- Determine benchmark and cap values of PAU rates. The benchmark value is used to determine whether a hospital will receive a reduction target. Hospitals with PAU rates at or below the benchmark are considered high-performing, and will not receive a reduction target. The cap value is used to determine the maximum reduction rate a hospital may receive. Hospitals with PAU rates above the cap rate will receive the same reduction rate regardless of their actual PAU rates. Benchmark and cap values are established for inpatient and ED settings separately. For both Medicare FFS and commercial payers, the benchmark value is the 20th percentile from the distribution of three-year average PAU rates among peer-group hospitals in the benchmark pools. The cap value is the 80th percentile from the distribution among peer-group hospitals.

In Years 1 and 2 (2019 and 2020), no reduction is made to the global budget based on the PAU opportunity target. PAU metrics are measured for reporting and monitoring. In Year 3 (2021), the global budget for the hospital is reduced prospectively by 25% of the PAU opportunity target. In Year 4 (2022) and beyond, the global budget for the hospital is reduced prospectively by 50% of the PAU opportunity target.

Demographic Adjustment – The Demographic adjustment refers to the process of incorporating the change in the size of the underlying population served by each hospital. The demographic adjustment approach is adopted from Maryland Health Services Cost Review Commission (HSCRC)'s methodology. The adjustment requires five elements:

- Determine hospital's service volume distributed across age/county cohorts in all counties in the Commonwealth. Age groups and counties are used to define demographic groups. Age groups and counties are defined in Section 5.1.A common unit of service volume across inpatient and outpatient NPR categories needs to be in place; the concept of inpatient discharge equivalent, calculated as the sum of hospital's inpatient discharges and outpatient equivalent discharges. Outpatient equivalent discharge is calculated as total outpatient NPR divided by the average NPR per inpatient discharge for the given hospital is used.
- Populations are attributed to each hospital based on the proportion of service volume the hospital provides to patients in each age-county cohort, relative to the service volume provided by all hospitals to patients in that age-county cohort. Only services that are part of the NPR categories are taken into consideration.

- Calculate estimated population change for the attributed population using population projections. PA population projections by county, gender and age for 2010 – 2040 (http://www.rural.palegislature.us/demographics_population_projections.html) were published by the Pennsylvania State Data Center for the Center for Rural Pennsylvania in 2013 and is used as an input in the demographic adjustment to estimate population change. The 5-year population estimates are annualized to calculate one-year change using linear growth rate for each year.
- Apply an age weight to the total number of beneficiaries in the age/county cohort of the hospital's patient service area to adjust for the differences in utilization. Age weight is defined as the ratio between:
  - Average NPR per person by age group
  - Average NPR per person across the state
- Calculate overall service volume growth rate, based on the percent difference in the sum of weighted-population in the current year from the sum of weighted-population in the base year.

Low Volume Adjustment – This adjustment compensates hospitals for fixed costs that they cannot recover under the prospective payment system when total discharges are low. The low-volume adjustment amount is based on a percentage coefficient, updated annually based on the number of inpatient discharges using a formula published in IPPS rules. Only hospitals that apply for and are eligible to receive a low-volume adjustment will receive a low-volume add-on payment in their Medicare global budget. For sole community hospitals (SCHs) and Medicare dependent hospitals (MDHs), the low-volume adjustment coefficient is applied to either the federal rate or the hospital-specific payment rate, whichever results in a greater operating IPPS payment. CAHs are not eligible for low-volume payments.

The low-volume payment amount is calculated as the product of the low-volume adjustment coefficient and the sum of inpatient acute care operational amount and inpatient acute care capital amount in the baseline prospective global budgets. The prospective low-volume adjustment payment amount for each budget year is calculated as follows:

- Determine if a hospital is eligible for low-volume adjustment payments under Medicare IPPS using the hospital's most recent Medicare cost report.
- Identify the hospital's total discharges as reported in the hospital's most recent cost report. Usually there is a 2-year lag in the cost reports, so use the 2017 cost reports for the 2019 global budget year, and use the 2018 cost reports for the 2020 global budget year, etc.
- Calculate the low-volume adjustment coefficient using the formula from the applicable IPPS Final Rule for the budgeting year.
- Calculate the prospective low-volume adjustment amount by multiplying the sum of the inpatient acute care operational amount and the inpatient acute care capital amount by the low-volume adjustment coefficient for the global budget year.

Planned Service Line Changes – When the Medicare FFS global budget includes a prospective adjustment for planned service line change, the revenue associated with such change will be updated using FFS claims experience adjusted by unit cost if it is considered an unmet need-related service line expansion to meet population health needs. Unmet need-related service lines include dental or oral, diabetes, gastroenterology and hepatology gynecological surgery, gynecology, hematology and immunology, HIV, infectious disease, normal newborn, obstetrics/delivery, IP psychiatry, rehab/aftercare, respiratory, substance abuse, ventilator support, cardiology, endocrinology, rhythm management, and behavioral health. In addition, any service lines addressing unmet community health needs by the triennial Community Health Needs Assessment (CHNA) qualify as unmet need-related. Any other planned service line changes will always be reconciled as part of the unplanned volume shift adjustment.

After two years of FFS reconciliation for the service line, the service line will be folded into the baseline global budget. At that point, the RHRC will work with the CMS Innovation Center to re-assess the unmet need status of the service line, determining whether the service line qualifies for additional FFS growth or it should be reconciled through UVS in subsequent years.

For commercial payers, all planned service line changes are reconciled using FFS claims experience for two years of such changes. Starting from the third year of the expansion, planned service line changes will be reconciled as part of the unplanned volume shift adjustment, as the baseline global budget has incorporated revenue from the planned service line changes. Hospital expecting further growth of a planned service line beyond two years may request such change during the budgeting process via their updated transformation reports. If approved, the planned service line may be reconciled using FFS claims experience for up to two more years.

Certain PSLs that involve expanded professional capacity (such as hiring an additional internist) at participating hospitals may have additional impact on ancillary services, such as labs and radiology. To account for such impact on commercial payers' global budgets (Medicare FFS budgets do not apply), a standard rate will be applied to the service line to assess the associated growth in ancillary services when there is a growth in professional capacity beyond the professional capacity in existence during the baseline global budget period. Starting budget year 2023, a standard-rate adjustment for each planned service line that exceeds $50,000 will be added to the hospital's reconciled global budget. For example, if a planned service line grows by $200,000 in 2023 at a hospital-payer level, and the standard-rate adjustment for that specialty is $60,000, the total planned service line adjustment for the hospital-payer will be $260,000. The established rates as included in this version of the DBR Appendix VI will be used for the duration of the program. The additional standard rate will be identified within the service line expansion template as a separate line item to flag for reconciliation. This adjustment will be applied only when the service line expansion including a standard rate calculated for that service line is estimated to be in excess of $50,000; otherwise, the service line expansion will be reconciled based on FFS growth without an ancillary services adjustment.

Reconciliation Adjustments

Unplanned volume shift (UVS) adjustments - Adjustment for unplanned volume shifts is conducted as part of annual reconciliation to account for unanticipated shifts in utilization during the planning process. During the Initial Global Budgeting process, preliminary calculations are performed using a 6-month period (January – June of the current budget period) to update the prospective budgets for the following year. The full-year calculations are performed during the annual reconciliation process to calculate the final settlement payments for the prior budgeting year.

Adjustment for unplanned volume shift does not reconcile all utilization increases or decreases. It takes into account only changes in a participating hospital's utilization that are matched by opposing changes in utilization for other hospitals serving the same geographic area. As such, the adjustment requires the following steps:

- Step 1: Definition of unit for geography and utilization volume: The units of analysis for defining geography is a catchment area. A catchment area is assigned for each participating hospital, and is a designated set of beneficiary ZIP codes where a population receiving the majority of the hospital's services reside.
  - Utilization is defined as inpatient discharge equivalents, which measure inpatient utilization as case-mix adjusted number of discharges and outpatient utilization as total outpatient payments divided by the average inpatient payment per case-mix adjusted discharge for the payer / catchment area / line of business. Utilization counts are based solely on facilities and services in scope for the global budget model.
- Step 2: Identification of potential unplanned volume shift for each payer / hospital / line of business for each geography and service line: The unplanned volume shift for a given payer / catchment area / hospital / line of business / service line combination is calculated as the difference between the following:
  Adjusted baseline utilization calculated as baseline utilization minus potentially avoidable utilization and planned service line utilization adjusted for payer-mix (commercial payer) or demographic (Medicare FFS) adjustments. For UVS occurring in Year 1, the baseline period corresponds to the year(s) selected for developing baseline net patient revenues. For subsequent budget years, baseline periods will be the prior budget year. As hospitals are incentivized to reduce PAUs and additional savings to payers will be calculated using PAU shared savings methodology, PAUs are excluded from all utilization counts using the estimates of percent PAU payments for each service line.
  - Select planned service line changes will be excluded from unplanned volume shift adjustments. For Medicare FFS, planned changes to service line(s) in budget years related to population health needs are excluded from unplanned volume shift adjustments. Additionally, clinic service line is excluded from UVS calculation. For commercial payers, planned service line change(s) are excluded from unplanned volume shift adjustments until associated revenue are incorporated into the Initial Global Budget.
- Step 3: Estimation of unplanned volume shift total for adjustment by geography and service line for each payer / line of business combination: To calculate changes in utilization at the catchment area level, facilities with net patient revenue less than or equal to minimum revenue threshold $20,000 (prorated to $10,000 for 6-

month calculations) for the payer / catchment area / hospital / line of business combination in both the budget year and baseline periods are excluded from the calculation.

  - The positive and negative volume shifts identified in Step 2 are aggregated separately. The unplanned volume shift for adjustment for a given payer / catchment area / line of business / service line combination is defined as the smaller absolute amount of the aggregated positive volume shift or the aggregated negative volume shift.

- Step 4: Assignment of the adjustable unplanned volume shift to hospitals serving the given geography and service line: The total volume for unplanned shift for a given geography and service line identified in Step 3 is distributed across the facilities with positive volume shift as utilization increases, based on their proportion in volume increase calculated in Step 2. The same volume is distributed across the facilities with negative volume shift as utilization decreases, based on their proportion in volume decrease calculated in Step 2.
- Step 5: Quantification of the volume for actual adjustment payment calculation: For each payer / line of business combination, the global budget hospital's adjustable unplanned volume shifts in each service line calculated in Step 4 are aggregated to generate the total potential unplanned volume shift adjustment for the given hospital and corresponding catchment area. The estimated adjustment for each global budget hospital is calculated as the product of the total potential unplanned volume shift adjustment across service lines and the average hospital payment for inpatient discharge equivalent in the catchment area.
- Step 6: Translation into budget adjustment: The estimated adjustment must meet the case count and materiality thresholds to qualify for an unplanned volume shift adjustment.
  - To moderate random fluctuations, a given payer / global budget hospital / catchment area / line of business combination will be excluded from the UVS calculation if the total utilization count (payer-mix, PAU, and planned service line adjusted) in the catchment area is less than 30 utilization in the baseline period.
  - Global budget hospitals with unplanned volume shift adjustments at the payer level that are less than the absolute value of 1) 2 percent of the revenue amount in the Updated Global Budget and 2) $100,000 will not receive an unplanned volume shift adjustment in the budget for that payer.

Clinic adjustments – Revenue from provider based clinics is not included in the global budget. However, because the current technical specifications for the derivation of net patient revenue includes all hospital outpatient claims as part of the NPR calculation for the initial hospital global budget, the global budget calculations include facility fees from provider-based clinics for all participating hospitals.

The clinic adjustment is calculated retrospectively using revenues from the provider-based clinic secondary service line in the unplanned volume shift data submission. The dollar adjustment is the difference between the provider-based clinic service line payments in the budget year and the baseline period, after adjusting the baseline for unit price and payer-mix changes (demographic adjustment for Medicare FFS). Clinic amounts from unplanned service line data report is adjusted to include non-catchment area revenues.

Non-hospital shift adjustments - The current unplanned volume shift algorithm measures changes in hospital inpatient and outpatient departments. However, some hospitals may experience growth or decline in their outpatient services are a result of shifts from or to non-hospital providers such as ambulatory surgical centers and local physician practices.

Hospitals may request for an analysis by the RHRC to see if they experienced volume shifts from or to non-hospital providers for particular services during the budget year. Similarly, payers may request such analysis if they identified potential volume shifts in claims data. Both hospitals and payers must inform the RHRC about the potential volume shifts prior to the annual reconciliation calculations, so that any additional data can be collected to inform analyses. Ad-hoc based supplemental analyses will be conducted to validate non-hospital shifts for the identified services, by examining changes in service volume at the hospital and at the relevant provider(s) outside of hospital. Based on the analyses, the RHRC will work with payers to determine what adjustment will be needed during the annual reconciliation process to account for the shifts.

Other adjustments - On a case by case basis, the RHRC may review, at the hospitals' request, discharges, drugs, or other one off expenses that are exceptionally high. Under these conditions, the RHRC will determine whether or not the payments associated with these events should be excluded from the global budget and reimbursed outside of the model.

Payer mix adjustments (commercial payers only) – On a semi-annual basis, global budget payments made by commercial payers will be redistributed to account for changes in the payer-mix at each hospital. These updates will reflect changes in enrollment at the payer / hospital / line of business level. Enrollment for each payer / hospital combination with a participation agreement will be measured for each quarter during implementation by line of business / gender / age for all ZIP codes included in the hospital's catchment area. Changes in enrollment will be adjusted via "cost weights" to account for differences in spending between different age / gender cohorts. The first semiannual adjustment in the budget year will be calculated comparing changes in enrollment in the first quarter of the budget year to global budget baseline period.

The steps to calculate payer-mix adjustments for the first implementation quarter are as follows:

- Step 1: Determine unit of geography for adjustment: Each participating hospital's catchment area is a designated set of ZIP codes where a population receiving the majority of the hospital's services reside. Each catchment area will be calculated using paid amounts during the baseline (i.e., all three potential baseline years) combining paid amounts from commercial payers and Medicare FFS. Catchment area zip codes will include ZIP codes in rural geographic area set by the CMS Innovation Center.
- Step 2: Calculate cost weights from baseline data: Cost weights will be applied to enrollment at the line of business / gender / age level. The cost weight for each line of business / gender / age cohort will be the ratio of paid amounts per member month at participating hospitals for the line of business / gender / age cohort to per member spending at participating hospitals for the line of business. Cost weights are calculated using all three years of the baseline for all participating hospital / payer combinations. Cost weights will be the same for all payer / hospital combinations. Data (both paid amounts at hospitals participating in the Model

and enrollment) used to calculate cost weights are limited to combined ZIP codes included in the participating hospital's catchment area (determined in Step 1). Cost weights will be assessed each budget year in which new hospitals and commercial payers are added to the model to determine if new participant data changes the existing weights. If significant changes are found, the weights will be updated to use for current and future years payer-mix adjustments.

- Step 3: Calculate baseline enrollment in members per month: For each payer / hospital combination with a participation agreement, calculate the baseline enrollment in members per month at the line of business / gender / age level for each ZIP code included in the hospital's catchment area.
- Step 4: Calculate first quarter (Q1) enrollment in members per month: For each payer / hospital combination with a participation agreement, sum the members per month in Q1 at the line of business / gender / age level for all ZIP codes included in the hospital's catchment area.
- Step 5: Apply cost weights to hospital-specific enrollment: Multiply baseline (Step 3) and Q1 (Step 4) enrollments at the line of business / gender / age level by their respective cost weights (Step 2) to obtain cost-weighted enrollment for each payer / hospital combination.
- Step 6: Calculate the change in enrollment in Q1 adjusted enrollment to baseline adjusted enrollment: At the line of business level, for each payer / hospital combination, divide the adjusted Q1 enrollment in members per month (result of Step 4, with Step 5 applied, summed to line of business level) by the adjusted baseline enrollment in members per month (result of Step 3, with Step 5 applied, summed to line of business level).
- Step 7: Calculate the adjusted global budget: At the payer / hospital / line of business level, multiply the initial quarterly global budget by the ratio of Q1 to baseline enrollment (Step 8) to obtain the Updated Global Budget for Q1. The initial quarterly global budget is the Initial Global Budget at the payer / hospital / line of business level divided by 4.

Cost report adjustments (CAHs Medicare FFS only) – During the reconciliation process, CAHs will see their revenue ultimately reconciled to cost based reimbursement as is the case for CAHs outside of the model.

References

1. Creswell J, Clark VLP. *Designing and Conducting Mixed Methods Research*. 3rd Edition. Sage Publications, 2017; 2023. Accessed March 2, 2023. https://us.sagepub.com/en-us/nam/designing-and-conducting-mixed-methods-research/book241842
2. Commonwealth of Pennsylvania, Centers for Medicare & Medicaid Services. *First Amended and Restated Pennsylvania Rural Health Model State Agreement*. Commonwealth of Pennsylvania, Centers for Medicare & Medicaid Services; 2018.
3. The Lewin Group. Memorandum "Pennsylvania Rural Health Model Service Area Methodology. Published online February 2019.
4. Yin RK. *Case Study Research and Applications: Design and Methods*. SAGE Publications; 2017. https://books.google.com/books?id=6DwmDwAAQBAJ
5. Herfindahl-Hirschman Index. Antitrust Division, US Department of Justice. Published January 17, 2024. Accessed March 3, 2024. https://www.justice.gov/atr/herfindahl-hirschman-index
6. Pennsylvania Department of Health. *Technical Specification for Rural Hospital Global Budget.* 2022.