POLICY BRIEF #52 APRIL 2020

Impact of CAH Participation in Flex Financial and Operations Improvement Activities on Hospital Financial Indicators

Kathleen Knocke, MSPH; Kristin Reiter, PhD; George H. Pink, PhD

KEY FINDINGS:

Under the Medicare Rural Hospital Flexibility (Flex) Program, states with Critical Access Hospitals (CAHs) are eligible to receive federal funds to support hospital improvement. This study finds:

- Compared to CAHs with no participation, CAHs with two years of participation and three years of participation showed increases in total margin of 1.60 and 3.95 percentage points, respectively.
- Compared to CAHs with no participation, CAHs with three years of participation showed a 3.16 percentage point increase in operating margin.
- We found no evidence that one year of participation improved profitability indicators, suggesting that continued participation may be necessary to see changes in financial indicators.
- Because interventions were not randomly assigned, we were unable to determine whether there was a causal relationship between participation and financial performance. Results were sensitive to model specification and should be interpreted with caution.

BACKGROUND

Under the Medicare Rural Hospital Flexibility (Flex) Program, states with Critical Access Hospitals (CAHs) are eligible to receive federal funds to provide technical assistance and/or direct support to CAHs for four types of financial and operational improvement: 1) Activity 2.01: a required statewide financial needs assessment, 2) Activity 2.02: an optional CAH specific needs assessment and action planning activity, 3) Activity 2.03: an optional financial improvement project, and 4) Activity 2.04: an optional operations improvement project.[1]

Under Activity 2.01, State Flex Programs are expected to conduct a high-level appraisal of the financial and operational vulnerabilities of their CAHs and use the results to inform the targeting of CAHs in greatest need as well as the implementation of proposed interventions under Activities 2.02, 2.03, and 2.04. As such, the results of the statewide financial needs assessment are not a direct intervention to improve the performance of CAHs in a given state but, rather, a source of data to support the program management and monitoring over the course of the funding cycle. *This brief defines participation as CAH participation in Activities 2.02, 2.03, and 2.04.*

State Flex coordinators develop and submit activity plans for the performance period to the Federal Office of Rural Health Policy (FORHP). Performance data about funded projects are submitted to FORHP through the Performance Improvement and Measurement Systems (PIMS). CAH participation in financial and operational improvement activities is described in companion FMT Policy Brief #49.

The purpose of this brief is to explore the impact of participation in financial and operational improvement activities on key hospital financial indicators. In this brief, we explore the following hypothesis:

> Participating in financial or operations improvement activities will be positively associated with improvements in selected financial indicators.

METHOD

Timeline. This brief uses CAH participation in financial and operational improvement activities between September 1, 2015 and August 31, 2018. The full performance period includes three years of performance data – Year 1 includes activities between September 1, 2015 and August 31, 2016, Year 2 includes activities between September 1, 2016 and August 31, 2017, and Year 3 includes activities between September 1, 2017 and August 31, 2018. Our model includes hospital cost report data from 2011 to 2018.

Outcome variables – selected CAH financial indicators. The Flex Monitoring Team uses 24 financial indicators to describe hospital profitability, liquidity, capital structure, revenue, cost, and utilization.[2] For this study, we hypothesized a priori that participation in financial and operational improvement activities could reasonably impact a subset of these indicators: total margin, operating margin, days revenue in net accounts receivable, current ratio, outpatient revenue to total revenue, hospital Medicare outpatient cost to charge, average daily census swing beds, average daily census acute beds, and salaries to net patient revenue.

Explanatory variables. The explanatory variable of interest is participation in a financial and operational improvement activity. Self-reported CAH participation in financial and operational improvement activities is collected through PIMS via each state Flex coordinator as part of the Flex program, and CAH participation in each activity and for each year of the performance period is coded as yes or no. In this brief we explore the impact of participation where participation is defined as a series of categorical variables indicating the number of years a CAH participated in a CAH specific activity (Activities 2.02, 2.03, and/or 2.04).

Additional explanatory variables related to CAH financial performance include whether a CAH operates a distinct part long-term care unit or operates a rural health clinic, CAH net patient revenue (under $10 million, between $10 million

and $20 million, and over $20 million), ownership type (for-profit, nonprofit, and government owned), and whether the state the CAH is located in expanded Medicaid services.[3,4] These variables were derived from the Centers for Medicare & Medicaid Services (CMS) Healthcare Cost Report Information System data, with the exception of state Medicaid expansion, which can be found on the Kaiser Family Foundation website.[5]

Analytical method: Fixed-effects regression model. When working with longitudinal data, fixed-effect regression models control for observable and unobservable variables that may affect the outcome of interest. Since the CAH financial indicators can be influenced by a number of changes within a hospital (e.g., reimbursement for services, payment models, hospital quality and performance initiatives, etc.), it is important to control for these unobservable factors when assessing the impact of hospital participation on the selected subset of financial indicators. Using the continuous definition of participation as the explanatory variable of interest, we estimated the impact of sustained participation on selected financial indicators using hospital fixed-effects regression models. To control for the introduction of state-level policies, introduction of federal-level policies, and general time trends, we included year as a fixed-effect variable in the model.

RESULTS

Of the subset of hospital financial indicators examined, we found a positive relationship between the number of years of participation and hospital profitability as measured by total margin and operating margin. Compared to CAHs with no participation, two years of participation and three years of participation were associated with 1.60 and 3.95 percentage point increases in total margin, respectively. Compared to CAHs with no participation, three years of participation was associated with a 3.16 percentage point increase in CAH operating margin.

TABLE 1. CAH participation in activities over the three-year evaluation period

Note: Participation is cumulative over the evaluation period.

Years of Participation	Number of CAHs
0	241
1	373
2	284
3	425
Any Participation	1,082
Total CAHs Included	**1,323**

DISCUSSION

Results of this analysis suggest that there may be an association between two and three years of participation in Flex financial and operations improvement activities and improvements in CAH profitability. Other model specifications, e.g., when participation in years was defined as a continuous linear variable, results were directionally consistent; however, the effect sizes were smaller. Moreover, we were not able to identify the pathway(s) by which improvements in profitability may have been achieved; therefore, results should be interpreted with caution. We found no evidence that one year of participation improved profitability indicators, suggesting that continued participation may be necessary to see changes in financial performance.

Limitations. First, because interventions were not randomly assigned, we cannot determine whether there was a causal relationship between participation and improvement in selected indicators. Financial indicator measures such as total margin and operating margin are at the organization-level and can be influenced by many factors outside of Flex activity participation.

TABLE 2. Description of outcome and explanatory variables at baseline by the number of years of CAH participation

Note: Values are shown for 2014, the year before any evaluation activity began.

Variables	No Participation	One Year of Participation	Two Years of Participation	Three Years of Participation	
Financial Indicators					
Total Margin (%)	0.023	0.029	0.012	0.016	NS
Days in Net Accounts Receivable	61.455	59.536	57.078	58.629	NS
Operating Margin (%)	-0.001	0.005	-0.008	-0.018	NS
Current Ratio (times)	6.492	3.536	2.938	2.990	***
Outpatient Revenues to Total Revenues (%)	0.747	0.737	0.734	0.728	NS
Medicare Outpatient Cost to Charge	0.447	0.523	0.491	0.478	***
Average Daily Census (ADC) Swing-SNF Beds	1.929	1.931	2.139	2.209	NS
Salaries to Net Patient Revenue (%)	0.456	0.461	0.461	0.469	NS
Average Daily Census (ADC) Acute Beds	5.073	3.810	4.076	4.290	***
Explanatory Variables					
Operate Long Term Care Unit	12.7%	21.7%	28.9%	32.8%	***
Operate Rural Health Clinic	41.8%	54.1%	57.0%	61.6%	***
Net patient revenue					
Under $10 Million	31.0%	30.5%	23.2%	17.4%	***
$10 - 20 Million	31.4%	32.7%	37.0%	36.7%	
Over $20 Million	37.6%	36.8%	39.8%	46.0%	
Ownership Type					
Nonprofit	47.0%	49.7%	58.8%	56.7%	***
For-profit	12.3%	3.8%	4.6%	2.4%	
Government Owned	40.7%	46.4%	36.6%	40.8%	
Census Region					
Northeast	0.4%	1.1%	4.3%	11.5%	***
Midwest	33.2%	68.0%	58.7%	33.0%	
South	54.4%	18.3%	17.1%	21.0%	
West	11.9%	12.6%	19.9%	34.5%	
N	268	364	284	409	

NS = Not statistically significant; Significance reported as *p<0.05, ** p<0.01, and ***p<0.001
Note: Some data for CAHs may be missing for 2014, accounting for differences between counts in Table 1 and Table 2

TABLE 3. Results from hospital fixed-effects regression model with participation defined as a categorical variable (in years)

Note: Coefficients for other explanatory variables are omitted from this table.

Financial Indicator	One Year of Participation	Two Years of Participation	Three Years of Participation
Total Margin (%)	-0.00205	0.0160*	0.0395**
Days in Net Accounts Receivable	0.600	0.876	-0.702
Operating Margin (%)	-0.00568	0.00847	0.0316*
Current Ratio (times)	-0.0166	0.0439	0.784
Outpatient Revenues to Total Revenues (%)	-0.00271	-0.00496	-0.0225*
Medicare Outpatient Cost to Charge	0.00288	-0.00518	-0.00801
Average Daily Census (ADC) Swing-SNF Beds	-0.0843	0.0389	0.474
Salaries to Net Patient Revenue (%)	0.000968	0.0000324	0.0131
Average Daily Census (ADC) Acute Beds	0.209***	0.126	0.180

Significance reported as *p<0.05, ** p<0.01, and ***p<0.001

Second, the analysis included only CAHs with data for all years (2011-2018) because the statistical package used for the fixed-effects model requires complete longitudinal data.

Implications of fixed-effects regression model. Fixed-effects regression models hold constant characteristics that do not change over time (e.g., state the hospital is located in). In effect, variables without variation within the CAH "drop-out" of the model. For example, the model excluded CAHs from states that had no CAH-specific activity because the participation variable within each CAH did not change over time.

RECOMMENDATIONS

Increasing the number of CAHs that sustain participation in optional CAH specific Flex activities may improve CAH profitability indicators. Less than a third of CAHs had three years of participation, and two states did not have any CAHs that participated in CAH specific interventions. While this analysis suggests multiple years of participation may improve profitability, we do not understand what is driving this improvement. Future research should explore the mechanisms by which improvement is achieved and ways to support CAH engagement in these activities.

Because of yes/no participation data available in PIMS, we are unable to look at the specific intervention activities or the intensity of activity efforts at each CAH beyond the number of years the CAH participated. This limits our understanding of which activities or which level of intensity within each activity is effective. Understanding the specific activities, time, or resources allocated at each CAH may advance the impact of the Flex Program.

REFERENCES

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2. Holmes GM, Pink GH, & CAH Financial Indicators Team. Analyzing Financial and Operational Performance of CAHs (April 2019). Flex Monitoring Team. Available at: https://www.flexmonitoring.org/publications/annual-financial-indicator-reports/

3. Pink GH, Holmes GM, Thompson RE, Slifkin RT. Variations in financial performance among peer groups of critical access hospitals. *The Journal of Rural Health.* 2007 Sep;23(4):299-305.

4. Kaufman BG, Randolph R, Pink GH, Holmes GM. Trends in risk of financial distress among rural hospitals (October 2016). North Carolina Rural Health Research Program, Sheps Center, UNC Chapel Hill. Available at: www.shepscenter.unc.edu/download/13777/

5. Kaiser Family Foundation. Status of State Medicaid Expansion Decisions: Interactive Map 2018.

APPENDIX A: Full table of results from hospital fixed effect model

Financial Indicators	Total Margin (%)	Days in Net Accounts Receivable	Operating Margin (%)	Current Ratio (times)	Outpatient Revenues to Total Revenues (%)	Medicare Outpatient Cost to Charge	Average Daily Census (ADC) Swing-SNF Beds	Salaries to Net Patient Revenue (%)	Average Daily Census (ADC) Acute Beds
Variables									
One Year of Participation	-0.00205	0.600	-0.00568	-0.0166	-0.00271	0.00288	-0.0843	0.000968	0.209***
Two Years of Participation	0.0160*	0.876	0.00847	0.0439	-0.00496	-0.00518	0.0389	0.0000324	0.126
Three Years of Participation	0.0395**	-0.702	0.0316*	0.784	-0.0225*	-0.00801	0.474	0.0131	0.180
Medicaid Expansion	0.0109**	-1.501	0.00963*	0.0502	0.00129	-0.00250	-0.0605	-0.00899**	-0.115*
Operate Long Term Care Unit	-0.0237*	-2.566	-0.0168	-0.0144	-0.0384***	-0.0286	-0.108	0.0348***	0.0725
Operate Rural Health Clinic	-0.00644	2.463*	-0.00604	2.428	0.0172***	-0.0209***	-0.0835	0.0221***	-0.0294
Net Patient Revenue									
$10 - 20 Million	0.0618***	-6.451***	0.0850***	-0.488	-0.00483	-0.0142	0.398***	-0.0633***	0.310***
Over $20 Million	0.105***	-9.583***	0.141***	0.411	-0.00449	-0.0275**	0.792***	-0.110***	0.694***
Ownership Type									
For-profit	-0.0411*	0.917	-0.0290	1.867	0.00511	-0.00978	0.0464	-0.0209	0.309
Government Owned	-0.0197	7.523*	-0.00961	0.0416	-0.0200	0.00536	-0.0552	0.0131	0.210
Constant	-0.0151	58.11***	-0.0705***	2.116*	0.721***	0.525***	1.623***	0.492***	4.450***
Observations	9538	9382	9531	9264	9535	9563	9647	9495	9641

Year Variable Omitted from Table; Net patient revenue reference category: <$10 Million; Ownership type reference category: Non-profit
Significance reported as *p<0.05, ** p<0.01, and ***p<0.001