Evaluation of the Rural Community Hospital Demonstration

Report Covering 2005 – 2017 (Interim Report 1)

Centers for Medicare & Medicaid Services

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EXECUTIVE SUMMARY

The Rural Community Hospital Demonstration (RCHD) was authorized under the Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003. The goal of the RCHD is to strengthen the financial condition of small, rural community hospitals and help them to meet the needs of Medicare beneficiaries who reside in their market areas by providing higher Medicare payments for covered inpatient hospital services. In order to be eligible for the RCHD, participant hospitals must:

- Be located in rural areas;
- Have fewer than 51 beds;
- Maintain a 24-hour emergency department; and
- Be ineligible for designation as a Critical Access Hospital (CAH).

Since its original authorization, the demonstration has been extended three times by the Patient Protection and Affordable Care Act (ACA) of 2010, the 21st Century Cures Act (CCA) of 2016, and the Consolidated Appropriations Act of 2021. Under the initial 5 year MMA authorization, only hospitals located in the 10 least populated states were eligible to participate and within those states the demonstration was limited to 15 hospitals. The ACA authorized the demonstration for another 5 years, expanded the eligibility to the 20 least populated states, and increased the maximum number of participating hospitals to 30 at one time (hospitals that left the demonstration could be replaced). The CCA authorized the demonstration for another 5 years and expanded eligibility to all states but prioritized the 20 least populated states. The Consolidated Appropriations Act, 2021 authorized the demonstration for another 5 years, without making any other changes to the eligibility.

This report continues the analysis found in the 2018 Report to Congress on the Rural Community Hospital Demonstration.[1] It investigates the impact of the RCHD on Medicare revenue and hospital financial condition measures for the study period 2005 thru 2017[2] for hospitals entering the demonstration between 2005 and 2012.   A total of 33 hospitals were analyzed, comprised of 17 hospitals entering under the MMA authorization ("MMA cohort") and 16 hospitals entering under the ACA authorization ("ACA cohort"). Hospitals entering the RCHD under the CCA authorization were excluded because they first joined the demonstration in FY 2018, a year following the analysis period for this report.

RCHD payment methodology

Without the RCHD, hospitals are paid for inpatient care under two payment systems: the inpatient prospective payment system [IPPS] for acute care, and the skilled nursing facility [SNF] prospective payment system for SNF care. For the first of the five-year participation period, payment for inpatient services is made at the hospital specific cost, which is used to calculate a base year target amount per discharge. In years two through five, payment is made at the lesser of cost or the target amount per discharge, adjusted for an update factor and case mix changes, multiplied by the number of discharges. The largest cost component is routine cost, which is the average of routine costs for acute and swing bed SNF services. Because routine costs for acute beds exceed those of swing bed SNF, the average cost of acute and swing bed SNF is higher than the cost of swing bed SNF only. As a result, swing bed RCHD payments are much higher than the SNF PPS payments, and hence is a primary driver of additional payments. Outpatient services continued to be paid under the Outpatient Prospective Payment System (OPPS) and were not affected by the demonstration.

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[1] A *Report to Congress* describing the effect of the RCHD on hospitals' financial condition between fiscal year (FY) 2005 and FY 2013 was publicly released in 2018 and available at https://innovation.cms.gov/files/reports/rch-rtc.pdf. The report analyzed participant hospital characteristics, the impact of the RCHD on finances and other outcomes, and decisions participant hospitals made in anticipation of the ending of the demonstration. This evaluation report covers some of the same topic areas covered by the 2018 *Report to Congress* (characteristics of participant hospitals, impact of the RCHD), but it includes more hospitals in the analysis (33 versus 22), more years of data (FYs 2005–2017 versus FYs 2005–2013), and uses a more rigorous approach to estimate the Demonstration's impact.

[2] As of the report compilation date of June, 2020, verified cost report data were available only up to FY 2017.

Data and methods

Data from Medicare cost reports were analyzed with descriptive univariate statistics (averages, percentages, t-tests) and with multivariate regression statistical techniques. The impact on key hospital financial measures was estimated using a Difference in Difference (DID) model, as this technique can provide a more robust approximation of the RCHD impacts than descriptive analyses and can estimate the impact of the RCHD on participant hospitals, relative to their performance in the absence of the demonstration. Qualitative information was provided through interviews with RCHD hospital executives.

Results are presented for the demonstration overall and for the cohorts of first entry (MMA, ACA). If a MMA hospital continued participation under the ACA authorization, it is included in the MMA cohort. Hospitals that left the demonstration are included in the analyses, but only for the time they were active in the RCHD. The results are also stratified by the type of market in which the hospital is located, defined as follows:

- Competitive market area (59% of RCHD hospitals): More than three hospitals within 35 miles
- Frontier market area (24% of RCHD hospitals): Two or fewer hospitals within 35 miles and a stable or growing population
- Isolated market area (17% of RCHD hospitals): Two or fewer hospitals within 35 miles and a declining population

KEY FINDINGS

Characteristics:

RCHD hospitals were largely non-profit hospitals with higher inpatient volumes located in somewhat higher income areas. At baseline (the 3 year period before joining the RCHD), participating hospitals were more likely to be non-profit, have more inpatient discharges, and treat more clinically complex patients compared to eligible non-participants. Participant hospitals were also more likely to be located in states that expanded Medicaid under the ACA, and located in less densely populated, but less poor and more educated, counties compared to eligible non-participants. RCHD hospitals were less likely to be located in Competitive markets. Prior to the RCHD, participant hospitals had a higher acute care average daily census (ADC): 15.4 for RCHD participants versus 13.5 for eligible non-participants, and more acute care beds (42 beds vs. 35).

MMA and ACA cohort hospitals differed in market competition, the number of discharges, and non-profit status. The majority of the ACA hospitals, 75 percent, were located in Competitive market areas, compared to 34 percent of MMA hospitals. The MMA hospitals had more yearly discharges than ACA hospitals: 1,716 versus 1,313 for ACA. A majority of RCHD participants were non-profit (76 percent MMA vs. 54 percent ACA) and part of a health system (77 percent MMA cohort vs. 57 percent ACA cohort),

Change in Medicare margins, payments, and utilization:

Medicare inpatient margins increased substantially, by 18 percentage points, from -18.6 percent on average in the baseline period (three years prior to participation) to -0.7 percent during participation. In eligible non-participant hospitals, Medicare inpatient margins declined slightly from -1.5 percent to -2.4 percent in the same time periods. Participant hospitals also increased their combined Medicare margins (inpatient and outpatient) from –18.4 percent prior to participation, to -11.1 percent during the demonstration. In the same time frame, the combined Medicare margins of eligible non-participant hospitals declined from -3.8 percent to -7.2 percent.

RCHD participant hospitals received higher payments for inpatient services (acute care and swing bed services) that were, on average, $1.8 million more per year, or 41 percent higher than they would have received under existing Medicare payment systems (IPPS and SNF PPS). The additional RCHD payments also increased over the year study period, from $1.5 million per year at the start of the demonstration in 2005 to $2.45 million per year by 2017. The magnitude of the additional RCHD payments varied significantly, with participant hospitals in the bottom tercile receiving on average $0.54 million more than under existing Medicare payments, compared to hospitals in the highest tercile receiving on average $3.49 million more.

RCHD swing bed payments were higher than under SNF PPS. RCHD swing bed payments were $ 0.7 million higher per year than what hospitals would have received under SNF PPS. The additional RCHD swing bed SNF payments ranged from $6,930 to $10,060 per-discharge in the MMA authorization phase (FY 2005 to FY 2009) and ranged from $7,220 to $11,050 per-discharge in the ACA authorization phase (FY 2010 to FY 2014). On average, the RCHD swing bed SNF payments represented an increase of 421 percent above the SNF PPS payments.

Inpatient utilization declined at RCHD participant hospitals. The ADC declined more over the demonstration period for RCHD participants, a reduction of 1.37 patients per day, compared to a reduction of 0.07 patients per day for eligible non-participant hospitals.

Impact of the RCHD on key hospital financial measures:

Prior to participation

Participant hospitals were in stronger overall financial condition compared to eligible non-participant hospitals. During the baseline period (3 years prior to participation), RCHD participating hospitals had more favorable financial measures:

- Total profit margins: 4.1 percent for participants versus -0.1 percent for eligible non-participants (measure includes all payer revenue, investment, and other income)
- Operating margins: 0.7 percent versus -5.8 percent (measure includes all payer revenue)
- Days cash on hand: 112 days versus 83 days
- Debt levels, as measured by the capitalization ratio (debt to total assets): 25.1 percent versus 36.6 percent
- Staffing efficiency, as measured by the ratio of salaries to net patient revenue: 44.2 percent versus 47.4 percent
- FTEs per occupied bed: 7.3 FTEs / bed versus 6.7 FTEs / bed

Capital investment, as measured by the average age of physical plant, was the only financial measure in which RCHD participants were less favorable at baseline: 16 years for RCHD versus 12 years for eligible non-participants. This means that RCHD participants had older physical plants than eligible non-participant hospitals.

Prior to joining the RCHD, the MMA cohort hospitals were on average in stronger financial condition than ACA cohort hospitals at baseline. Before joining the RCHD, MMA cohort hospitals had higher Medicare inpatient margins (-17.4% MMA vs -19.9% ACA), higher Medicare combined margins (-16.3% MMA vs -20.4% ACA), higher operating margins (2.5% MMA vs -1.1% ACA), and slightly higher total profit margins (4.4% MMA vs 3.8% ACA). In addition, the MMA cohort hospitals had more days cash on hand (116 days MMA vs 108 days ACA), but higher debt levels, as measured by the capitalization ratio (30% MMA vs 20% ACA).

Impact of the RCHD using a Difference-in-Differences (DID) Analyses:

To estimate the RCHD impact on margins and other financial measures, a DID regression model was used. The DID model can estimate the impact of the RCHD on participant hospitals, relative to their performance in the absence of the demonstration. This method used a comparison group selected from eligible non-participant hospitals, matched with characteristics similar to those of the RCHD hospitals. The DID analyses produced the following findings:

- **Participation in the RCHD had a large, positive and statistically significant impact on hospitals' inpatient and combined (inpatient and outpatient) Medicare margins**. Relative to the comparison group, participant hospitals saw an increase in Medicare inpatient margins—on average, by 13.7 percentage points (88 percent relative to the three-year average prior to the demonstration). Similarly, Medicare combined margins for participants increased, on average, by 8.8 percentage points relative to the comparison group. The RCHD increased Medicare margins for *both* the MMA (20.4 percentage points) and the ACA (17.3 percentage points) hospital cohorts, and for participant hospitals in Frontier (21.1 percentage points) and Competitive areas (15.9 percentage points). However, the RCHD appears not to have had an impact on Medicare margins for hospitals located in Isolated areas. Although the analytical methods employed accounted for smaller sample sizes, it is possible that the very small number of hospitals in Isolated markets (N=5) made the analysis more susceptible to confounding by large variations among a few participant hospitals.

- **The RCHD did not have a statistically significant impact on operating margins and total profit margins.** These margins include revenue from other payers, investment income, etc., which may obscure the impact of higher Medicare payments.

- **Participation in the RCHD increased the Medicare share of hospitals' swing bed revenue, but had no effect on the Medicare proportion of inpatient discharges and inpatient days**. Relative to the comparison group, RCHD hospitals' share of Medicare inpatient revenue coming from swing beds increased by 90 percent (an increase of 5.3 percentage points from a baseline mean of 5.9 percent). This result is consistent with the payment methodology design, as well as with the qualitative information from interviews describing the importance of swing beds in enhancing participants' RCHD payments. This result was also observed in the ACA and MMA cohorts, and in the Competitive and Frontier hospitals, but not for Isolated hospitals. While the Medicare share of inpatient days declined slightly, by 0.78 percentage points relative to the comparison group, the change was not statistically significant.

- **Participation in the RCHD was associated with higher capital investments (i.e., reduction in the average age of physical plant)**. Relative to the comparison group, RCHD participants, on average, decreased their average age of physical plant by 18 percent (a decrease of 2.9 years from a pre-demonstration mean age of physical plant of 16 years). This result was due to the ACA hospital cohort, as they exhibited a 27 percent decrease in their average age of physical plant, while the MMA cohort hospitals showed no change.

- **Except for the improvement in capital investment, the RCHD had little impact on the overall financial condition of the participating hospitals, as their financial condition remained better than comparison hospitals**. RCHD participation did not show a statistically significant effect on the financial indicators analyzed, including days cash on hand, long-term debt-to-capitalization ratio, ratio of salaries to net patient revenue, and hospital FTEs per occupied bed. These results align with the qualitative information collected from interviews with hospital executives.

Disposition of the hospitals leaving the RCHD:

Between FY 2005 and FY 2017, 16 of the 33 MMA and ACA hospitals left the RCHD: 2 closed, 6 became CAHs, and 8 became Sole Community Hospitals (SCH). Of the two hospitals that closed, one was deemed unsustainable as a result of being located in a small town in South Dakota with a declining population of fewer than 1,000 people. The other was located in Kansas and closed as a result of a declining population and competition from a nearby CAH and a regional hospital. Of the 6 hospitals that became CAHs, 4 withdrew in 2005, when the 35-mile CAH distance requirement could still be waived by state governments. Of the 8 hospitals that became SCHs, 2 hospitals left when the SCH program rebased costs from FY 1996 to FY 2006, and the remaining 6 ostensibly left for higher Medicare payments, of which 3 subsequently became CAHs. The RCHD continued with the addition of 12 hospitals that first joined the RCHD under the CCA authorized extension, making a total of 29 hospitals in the demonstration at the end of 2017.

Conclusion:

Using both descriptive and multivariate methods, this evaluation found that for most participants, the RCHD achieved its goal of providing higher Medicare payments for covered inpatient hospital services. Descriptive statistics show that Medicare inpatient margins increased substantially, by 18 percentage points, from -18.6 percent In the three years prior to participation, to -0.7 percent after.   Under the RCHD, participant hospitals received higher payments for inpatient services (acute care and swing bed services) that were, on average, $1.8 million per year, or 41 percent, more than what they would have received under Medicare payment systems. The additional RCHD payments also increased over the study period, from $1.5 million per year on average at the start of the demonstration in FY 2005 to $2.45 million per year by FY 2017. The RCHD increased Medicare inpatient margins for *both* the MMA (20.5 percentage points) and the ACA (17.3 percentage points) hospital cohorts, and for participant hospitals in Frontier (21.2 percentage points) and Competitive areas (15.9 percentage points). However, the RCHD appears not to have had an impact on Medicare margins for small number of hospitals (n=5) located in Isolated areas.

A multivariate DID analysis found that the RCHD boosted the Medicare inpatient margins by 14 percentage points on average, relative to a comparison group of similar hospitals. The RCHD did not have a statistically significant impact on the other financial measures studied. These included operating margins (all payer), total profit margins (all income), and most of the other

financial indicators analyzed, including days cash on hand, long-term debt-to-capitalization ratio, ratio of salaries to net patient revenue, and hospital FTEs per occupied bed. The RCHD was associated with higher capital investments (i.e., reduction in the average age of physical plant). Consequently, the financial condition remained strong for participating hospitals before and during the demonstration.

Between FY 2005 and FY 2017, 16 of the 33 MMA and ACA hospitals left the RCHD. The RCHD continued with the addition of 12 hospitals that first joined the RCHD under the CCA authorized extension, making a total of 29 hospitals in the demonstration at the end of 2017.

1 INTRODUCTION

1.1 The Rural Community Hospital Demonstration

The Rural Community Hospital Demonstration (RCHD) was authorized under the Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003 "to test the feasibility and advisability of the establishment of rural community hospitals to furnish covered inpatient hospital services to Medicare beneficiaries". The goal of the demonstration is to strengthen the financial condition of small, rural community hospitals and help them to meet the needs of Medicare beneficiaries who reside in their market areas by providing the potential for higher Medicare payments for covered inpatient hospital services. Rural hospitals with fewer than 51 beds that maintained a 24-hour emergency department and were also ineligible to be designated a Critical Access Hospital (CAH) were eligible for the demonstration. Since its original authorization, the demonstration has been extended three times: by the Patient Protection and Affordable Care Act (ACA) of 2010, the 21st Century Cures Act (CCA) of 2016, and the Consolidated Appropriations Act, 2021.

Under the initial 5 year MMA authorization, only hospitals located in the 10 least populated states were eligible to participate and within those states, the demonstration was limited to 15 hospitals. The ACA authorized the demonstration for another 5 years, expanded the eligibility to the 20 least populated states, and increased the maximum number of participating hospitals to 30.   The CCA authorized the demonstration for another 5 years and expanded eligibility to all states but prioritized the 20 least populated states. The Consolidated Appropriations Act, 2021 authorized the demonstration for another 5 years, without making any other changes to the eligibility.

This report describes the contextual characteristics of RCHD participants, the Medicare payments received under the demonstration, and the impact of the RCHD on the financial condition of participant hospitals for the period of the demonstration covering federal fiscal year (FY) 2005 through FY 2017. Cost report data in and after FY 2018 were mostly preliminary as of the writing of this report. The quantitative analysis in this report summarizes the experience of the 33 hospitals that first joined the RCHD under the MMA initial authorization and the ACA extension. Exhibit 1.1: **Location and Status of RCHD Hospitals** shows the locations of these 33 hospitals, as well as the locations of the RCHD hospitals that joined under the CCA extension; information about this second set of hospitals will be included as part of the *RCHD Second Interim Evaluation Report*. The qualitative analysis is based on information from

interviews with 26 currently active hospitals that first joined under one of the three first authorizations of the RCHD (MMA, ACA, or CCA).

In September 2019, the Centers for Medicare and Medicaid Services (CMS) selected IMPAQ International, LLC, to conduct the third evaluation of the RCHD.[3] The team included IMPAQ International, LLC, together with its partner Mission Analytics Group and an advisory group of subject matter experts from the Healthcare Financial Management Association (HFMA), and the University of Iowa's Rural Policy Research Institute (RUPRI) Center for Rural Health Policy Analysis.

Exhibit 1.1: Location and Status of RCHD Hospitals
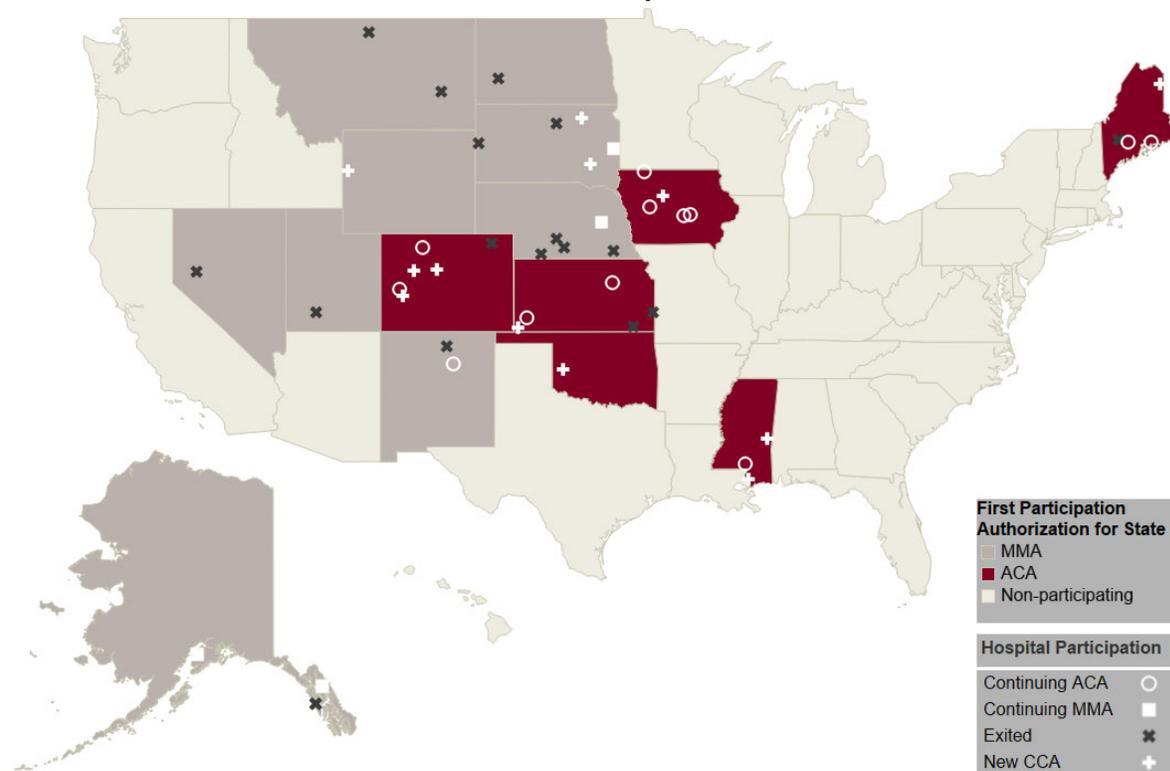
Notes: *This map also includes hospitals that first joined the RCHD under the CCA authorization extension (CCA cohort hospitals). Exiting hospitals include hospitals that withdrew from the RCHD in the middle of an authorization phase (nine hospitals), did not continue at the end of an authorization period (six hospitals), or closed (two hospitals).*

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[3] The results of the first evaluation of the RCHD are reported in the *Interim Evaluation Report of the Rural Community Hospital Demonstration* (unpublished report submitted August 30, 2011 to CMS), which studied the experience of RCHD hospitals under the initial MMA authorization. The results of the second evaluation, which focused on the experience under the ACA extension, can be found in the October 2018 *Report to Congress*, available at https://innovation.cms.gov/Files/reports/rch-rtc.pdf, and in the *Rural Community Hospital Demonstration Evaluation: Expansion under the Affordable Care Act, Final Report* (unpublished report submitted September 13, 2017 to CMS).

2.1.2 Payment Methodology

Hospitals that participate in the RCHD receive modified payments compared to the payments they would have received under the current Medicare inpatient prospective payment system (IPPS) and the skilled nursing facility (SNF) prospective payment system (PPS). In the first year under the demonstration (referred to as a hospital's base year), hospitals are paid on the basis of reasonable costs for inpatient services delivered in acute or swing beds. Certain small, rural hospitals can enter into a swing bed agreement, under which the hospital can use its beds, as needed, to provide either acute or skilled nursing facility (SNF) care.[4] In this report, "swing beds" refer to their use in providing SNF care. To be covered under Medicare, the post-acute services must meet the same level of care requirements applied to the reimbursement of services by SNFs. After the base year, RCHD hospitals are paid the lesser of the reasonable costs for that year or a target amount based on costs in the base year.

Reasonable costs

Under the RCHD payment methodology, reasonable costs are calculated separately for acute and swing bed services. The swing bed payment methodology blends costs for acute care and swing bed services. Because costs for acute beds are in general much higher, blending the two together makes swing bed reimbursement under the RCHD much higher than swing bed reimbursement outside of the RCHD.

Target amounts in years after the base year

Target amounts for each participating hospital are calculated annually after the base year by the Medicare Administrative Contractors (MACs). The MACs calculate target amounts separately for acute care and swing bed services using methodologies that are calculated in an analogous fashion between acute care and swing bed services. Target amounts are determined by adjusting upward the average cost per discharge in the base year by:

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[4] https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/SNFPPS/SwingBed

- The IPPS/SNF PPS update factor, to account for inflation, for both acute care and swing beds, depending on the target amount being calculated).[5]

- A case mix index (CMI) adjustment (current year index relative to base year index), based on changes in disease severity among the hospital's Medicare patients. A separate CMI for acute care and swing bed services[6] is used depending on the target amount being calculated.

- The number of Medicare discharges (acute or swing bed discharges depending on the target amount being calculated) in the current year (volume).

RCHD payments

In each year after the base year, RCHD payments for both inpatient acute care and swing bed services are equal to the lower of two values: current year costs *or* the hospital's target amount. The methodology used to calculate swing beds costs explained above results in substantially higher payment under the RCHD for swing beds compared to the payment that would have been made under the SNF PPS. Moreover, because Medicare represents a larger proportion of swing bed days than other payers, the allocation attributes more overall costs to Medicare, and fewer costs to other payers.[7] RCHD participants have an incentive to provide SNF services to Medicare patients in swing beds to the extent possible in each year they participate in the RCHD whether they are reimbursed on current year costs or the target amount for that year. This payment structure is not unique to the demonstration; rather, it is also a feature of the CAH payment methodology. The RCHD payment methodology and a detailed explanation of why hospitals stand to gain by delivering more care to Medicare patients in swing beds rather than acute care beds are provided in Appendix A.

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[5] In this report, "year" refers to the 12-month cost reporting period. Different hospitals may have cost reporting periods that start and end on different dates. The IPPS update is the market basket adjustment that CMS implements annually to update the operating rate component of the IPPS. The market basket index measures the price increases of goods and services hospitals buy to produce patient care. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/html/medicare-payment-systems.html

[6] CMI adjustment for swing bed services was only applied to hospitals with swing bed discharges joining the RCHD in FY 2005. In particular, it was applied to 4 RCHD hospitals with cost reports between FY 2007 and FY 2009.

[7] CMS. (2018, October). *Report to Congress: Rural Community Hospital Demonstration,* p. 8. https://innovation.cms.gov/files/reports/rch-rtc.pdf

Because RCHD hospitals receive payments for inpatient hospital services based on a reasonable cost methodology, they are not eligible to receive other types of IPPS payments, such as the low-volume payment adjustment.[8] Also, because RCHD payments are required to be budget neutral, IPPS payments to all non-RCHD hospitals are reduced each year to reflect the total amount of RCHD payments that exceed IPPS payments. This reduction is likely minimal given the scale of this demonstration. Exhibit 1.2 gives an overview of the RCHD payment methodology.

Exhibit 1.2: Overview of the RCHD Payment Methodology

Year 1	Year 2	Year 3	Year 4	Year 5

Start of participation

End of participation

Base Year
Reasonable and allowable costs

Years 2–5
Lesser of allowable costs or a target amount to base year cost per discharge updated for inflation (PPS update factor), case mix, and volume
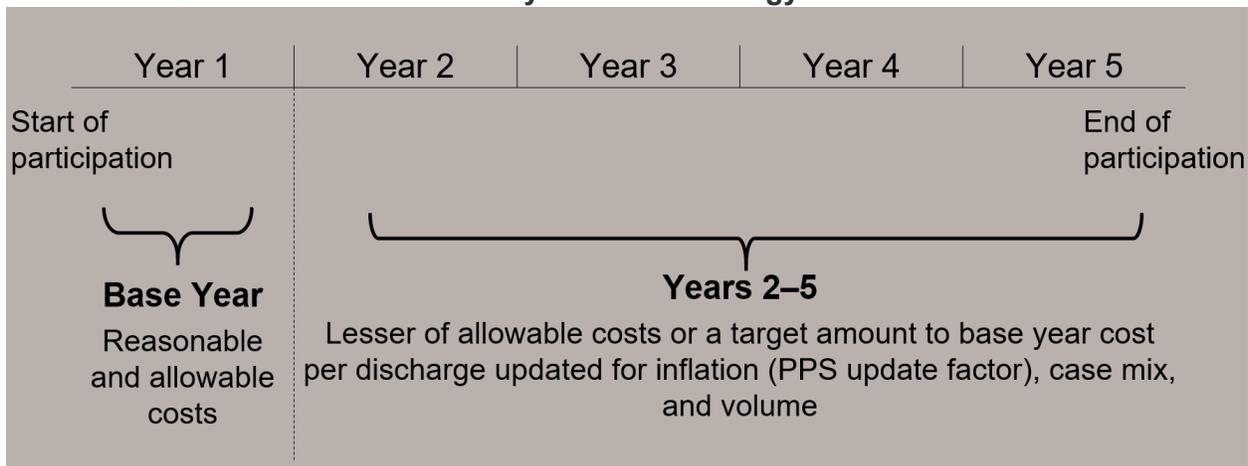
The higher RCHD payment is appealing to hospitals that have Medicare inpatient costs that are higher than the IPPS reimbursement (i.e., negative inpatient margins). While infrequent, it is possible for RCHD payments to be lower than the IPPS payments. These factors can influence which hospitals choose to participate in the demonstration and their decision to withdraw.

Rebasing

Under the MMA initial authorization, hospitals had base years beginning in FY 2005 or FY 2009, depending on when they joined the RCHD.

Under the ACA extension, hospitals that started participating in FY 2005 were rebased to FY 2010, and those that started in FY 2009 were rebased to FY 2011. Hospitals were paid based

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8 The low-volume adjustment is discussed in more detail in Section 1.2.4.1.

on their costs in the rebased years. New hospitals joining under the ACA extension had base years in FY 2011 or FY 2012, depending on when their (hospital) fiscal year began.

Under the CCA extension, hospitals that initially joined the RCHD in FY 2005 and FY 2009 were rebased to FY 2015 and FY 2016, and hospitals that initially joined the RCHD in FY 2011 and FY 2012 were rebased to FY 2016 and FY 2017.

Exhibit 1.3: Rebase Years for Hospitals Continuing Participation in RCHD, by Hospital Cohort			
Cohort	Base Year	Rebased Under ACA	Rebased Under CCA
MMA	FY 2005	FY 2010	FY 2015
	FY 2009	FY 2011	FY 2016
ACA	FY 2011	*N/A*	FY 2016
	FY 2012	*N/A*	FY 2017

1.2 Other Payment Systems Available to Small Rural Hospitals Under Medicare

This section describes the payment mechanisms and other rural hospital policy changes that may be relevant to RCHD hospitals. As Exhibit 1.4 shows, the RCHD is one of five existing payment options Medicare provides to help sustain small rural hospitals. In addition, small rural hospitals are also potentially eligible for several types of IPPS adjustments such as low-volume adjustments, or Disproportionate Share Hospital (DSH) payments.   According to the 2018 *Report to Congress,*[9] 33 percent of RCHD hospitals also qualified as Sole Community Hospitals (SCHs), and 24 percent qualified as Medicare-Dependent Hospitals (MDHs) prior to joining the demonstration.[10,11] The 2018 *Report to Congress* also notes that 18 percent of RCHD hospitals

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[9] CMS. (2018, October). *Report to Congress: Rural Community Hospital Demonstration,* p. 9. https://innovation.cms.gov/files/reports/rch-rtc.pdf

[10] According to page 16 of the 2018 *Report to Congress,* 11 RCHD hospitals qualified as SCHs prior to the demonstration (11/33 = 33 percent), and eight RCHD hospitals qualified as MDHs (8/33 = 24 percent).

[11] In comparison, according to the Medicare Payment Advisory Commission (MedPAC), 64 percent of rural hospitals are CAHs, 17 percent are SCHs, 6 percent are MDHs, and 13 percent are standard PPS hospitals (MedPAC. [2019]. Critical Access Hospitals payment system [*Payment Basics* policy brief series]. http://medpac.gov/docs/default-source/payment-basics/medpac_payment_basics_19_cah_final_sec.pdf?sfvrsn=0).

withdrew between 2004 and 2013 to become CAHs, and 12 percent withdrew to become SCHs.[12]

Exhibit 1.4: Medicare Payment Programs and Demonstrations for Rural Hospitals[13]			
Payment Option	**Acute Care Services†**	**Swing Bed Services[a]**	**Outpatient Services**
Critical Access Hospital (CAH)*	101% of reasonable costs	101% of reasonable costs	101% of reasonable costs
Rural Community Hospital Demonstration (RCHD)	**Lesser of reasonable costs or target amounts based on base year costs updated to current year, case mix, and volume**	**Lesser of reasonable costs or target amounts based on base year costs updated to current year, case mix[b], and volume**	Federal OPPS rate plus 7.1% for services other than drugs & biologicals if SCH
Sole Community Hospital (SCH)	Greater of federal IPPS rate or base year costs updated to current year, case mix, and volume	Federal skilled nursing facility (SNF) PPS rate	Federal OPPS rate plus 7.1% for services other than drugs and biologicals if SCH
Medicare-Dependent Hospital (MDH)**	IPPS rates plus 75% of the amount by which updated hospital-specific base year cost exceeds the PPS rate	Federal SNF PPS rate	Federal OPPS rate
Prospective Payment System	Federal IPPS rate	Federal SNF PPS rate	Federal OPPS rate
Low-Volume Adjustment***	Up to 125% of IPPS, MDH, or SCH payment	_	_

Abbreviations: IPPS, Inpatient Prospective Payment System; OPPS, Outpatient Prospective Payment System; PPS, Prospective Payment System.
Notes: (1) The RCHD, SCH, and MDH programs use different base years that may result in higher or lower payments to hospitals. (2) * CAHs are technically considered a different provider type. (3) ** This payment provision applies to discharges after October 1, 2006. Enhanced payments for MDHs have been extended through FY 2017 (September 30, 2017). (4) *** For FY 2005–2010, hospitals had to have 200 or fewer total annual discharges to receive a low-volume adjustment. For FY 2011–2017, the threshold was increased to 1,600 Medicare discharges. (5)[a] Swing bed refers to the use of hospital beds in providing SNF care. (6)[b] Case mix index adjustment for swing bed services was only applied to hospitals with swing bed discharges joining the RCHD in FY 2005. In particular, it was applied to 4 RCHD hospitals with cost reports between FY 2007 and FY 2009.

Sources: MedPAC. (2013, October). Hospital acute inpatient services payment system [Payment Basics policy brief series].
MedPAC. (2013, October). Skilled nursing facility services payment system [Payment Basics policy brief series].
MedPAC. (2013, October). Outpatient hospital services payment system [Payment Basics policy brief series].
CMS. (2011, July). CMS Manual System Pub. 100-19 demonstrations, transmittal 77.
CMS. (2015, June). MLN Matters (MLN9197-Revised).

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[12] According to page 3 of the 2018 *Report to Congress,* six RCHD hospitals withdrew to become CAHs (6/33 = 18 percent), and four withdrew to became SCHs (4/33 = 12 percent).

[13] CMS. (2018, October). *Report to Congress: Rural Community Hospital Demonstration,* p. 9.
https://innovation.cms.gov/files/reports/rch-rtc.pdf

1.2.1 Critical Access Hospitals (CAHs)

CAHs are excluded from both IPPS and Outpatient Prospective Payment System (OPPS) payment rules and instead receive cost-based reimbursements. As such, the CAH program provides the highest level of Medicare cost-based reimbursement among the five payment programs or demonstrations in Exhibit 1.4. The CAH program was established through the Medicare Rural Hospital Flexibility (Flex) Program, which was authorized in the Balanced Budget Act of 1997. The program is designed to ensure that Medicare beneficiaries in isolated rural communities have access to emergency room services and limited inpatient services.[14]

To be certified as a CAH, rural hospitals must be located more than 35 miles from other hospitals, located more than 15 miles from other hospitals in the case of mountainous terrain or only secondary roads, or certified as a CAH prior to January 2006 based on the state's designation as a "necessary provider." A CAH must also maintain no more than 25 inpatient beds (acute beds and swing beds, provided that the number of beds used at a given time for acute care does not exceed 15), have an average annual length of acute care stay of 96 hours or fewer per patient, and provide 24-hour emergency care seven days a week.[15]

As of October 2019, there were 1,349 certified CAHs in the United States, a number that has not grown much in recent years. One reason for this lack of growth is that prior to January 1, 2006, states had the option of waiving the proximity requirement by designating a hospital as a "necessary provider." As of 2011, 56 percent of existing CAHs met the proximity requirement through this option.[16] When the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 eliminated this option, few new hospitals obtained the CAH designation. Between

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[14] MedPAC. (2001, June). *Report to the Congress: Medicare in rural America,* p. 34*.* http://www.medpac.gov/docs/default-source/reports/Mar03_Entire_report.pdf

[15] CAH hospitals must also be located in a state that participates in the State Flex Program, under which they can be certified as CAHs. Currently, all but five states participate in the Flex Program.

[16] These estimates are based on the report *Most Critical Access Hospitals Would Not Meet the Location Requirements If Required to Re-Enroll in Medicare* (OEI-05-12-00080) by the Office of Inspector General of the U.S. Department of Health and Human Services and published in August 2013. This report estimates that 64 percent of CAHs (846 of 1,329 CAHs in 2011) would not meet the distance requirement if required to re-enroll and, of those, 89 percent (749 of 846) were "necessary provider" CAHs.

2006 and 2013, only 75 rural hospitals were newly designated as CAHs, but since 2005, 63 CAHs have closed, which has contributed to the stability of the number of CAHs over time.[17]

Prior to the sequestration adjustment, RCHD payments are capped at 100 percent of the reasonable allowable costs, while CAHs receive 101 percent of the reasonable and allowable costs. RCHD hospitals are not eligible to be CAHs, but as mentioned above, 18 percent of RCHD hospitals withdrew between 2004 and 2013 to become CAHs, according to the 2018 *Report to Congress*.

1.2.2 Sole Community Hospitals (SCHs)

Rural hospitals that provide acute care to Medicare beneficiaries but do not qualify as CAHs may be eligible for designation as SCHs. SCHs may receive inpatient reimbursement greater than the standard IPPS rates. For inpatient care, an SCH receives the greater of the standard IPPS rate or a reimbursement based on cost. Like the RCHD target payment methodology described above, the inpatient SCH cost reimbursement is calculated as base year costs per discharge updated using the IPPS update factor and a case-mix adjustment, multiplied by the current year discharges. Hospitals may select either FY 1982, FY 1987, FY 1996, or FY 2006 cost reporting periods as a base year for determining payments, whichever yields the highest reimbursement. SCHs receive standard SNF PPS rates for post-acute care services.

In addition to the inpatient adjustment, SCHs also receive enhancements to OPPS payments. Starting in FY 2006, SCHs received a 7.1 percent augmentation to the OPPS rates for all outpatient services except drugs and biologicals. In addition, the Medicare Improvements for Patients and Providers Act of 2008, or MIPPA, expanded the Medicare hold-harmless transitional outpatient payment to SCHs with 100 or fewer beds for outpatient services in calendar year 2009.

The SCH designation is intended to support hospitals that are the primary inpatient providers for Medicare beneficiaries in their service areas. The hospital's service area is defined as the area that accounts for 75 percent of all inpatient discharges in the most recent 12-month cost

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[17] University of North Carolina, Sheps Center. (n.d.). 179 rural hospital closures: January 2005–present (135 since 2010); closures by Medicare payment classification. https://www.shepscenter.unc.edu/programs-projects/rural-health/rural-hospital-closures/

reporting period. A rural hospital can qualify for SCH status if it satisfies one of the following criteria:

1. The hospital is located at least 35 miles from other similar acute care hospitals.[18]

2. The hospital is classified as rural, is located between 25 and 35 miles from other similar acute care hospitals, and accounts for 75 percent or more of all hospital inpatient discharges within the 35-mile radius in the most recent 12-month cost reporting period. Hospitals with fewer than 50 beds that do not meet the 75 percent criterion because some of their beneficiaries are forced to seek specialized health services outside of the hospital's service area are treated as satisfying the requirement.

3. The hospital is classified as rural and located between 15 and 25 miles from other similar acute care hospitals, but, due to local topography or periods of prolonged severe weather conditions, those other hospitals are inaccessible for 30 days or more in two of three years.

4. The hospital is rural and, because of distance, speed limits, and predictable weather conditions, the travel time between the hospital and the nearest similar acute care hospital is at least 45 minutes.

RCHD hospitals can qualify as SCHs, and, if previously an SCH, they receive OPPS payments. In fact, the 2018 *Report to Congress* shows that 33 percent of RCHD hospitals also qualified to be SCHs, and 12 percent withdrew from the RCHD to become SCHs.

1.2.3 Medicare-Dependent Hospitals (MDHs)

Rural hospitals not classified as a CAH or SCH may receive additional payments if they qualify as MDHs.[19] The MDH program was established to help rural hospitals that are financially vulnerable under the IPPS methodology because Medicare patients constitute a substantial proportion of their total discharges. Rural hospitals with no more than 100 beds that have at least 60 percent of inpatient days or discharges covered by Medicare may qualify as MDHs.

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[18] "Other similar acute care hospitals" refers to hospitals that provide short-term acute care services, are paid under the Medicare acute care hospital IPPS, are not CAHs, and are not paid under any other Medicare PPS.

[19] Congress has extended the MDH program several times since its establishment. At the time of preparing this report, the program had been extended through September 30, 2022.

For Medicare inpatient services, MDHs receive the higher of the IPPS rate or a blended rate. The blended rate is the IPPS rate plus 75 percent of the amount by which base year costs per discharge for Medicare patients trended forward exceed the IPPS rate. Hospitals may choose base year costs per discharge using FY 1982, FY 1987, or FY 2002 as their base year.[20] MDHs receive SNF PPS rates for post-acute care services and OPPS rates for outpatient services.

The program was not approved for FY 2018, but the August 2019 IPPS Final Rule extended it for five years. Retroactive payments were provided.

RCHD hospitals can qualify as MDHs, and, according to the 2018 *Report to Congress,* 24 percent of RCHD hospitals also qualified to be MDHs.

1.2.4 Inpatient Payments for Rural Hospitals

This section discusses the inpatient payment adjustments that the RCHD hospitals could be eligible for if they were to remain under IPPS.

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[20] This payment provision applies to discharges after October 1, 2006. For discharges before October 2006, MDHs received the IPPS rates plus 50 percent of the amount by which the base year costs exceeded the IPPS rate. In addition, MDHs experiencing a significant decline in volume (more than a 5 percent decrease in discharges in one year) may qualify for payment adjustments to cover minimum staffing and fixed operating costs.

1.2.4.1 Low-Volume Adjustment

Small hospitals with fewer than 1,600 Medicare discharges and located more than 15 miles from the nearest hospital may qualify for low-volume adjustments to their IPPS payments. The low-volume adjustment helps hospitals that have a high cost per discharge associated with low patient volume.

Established under the MMA, the original adjustment was a 25 percent add-on to the IPPS payment for hospitals located more than 25 miles from the nearest hospital and with fewer than 200 total discharges annually. The ACA temporarily expanded the low-volume adjustment to include hospitals at least 15 miles from another hospital and with up to 1,600 Medicare inpatient discharges (including beneficiaries in Medicare Advantage plans) for FY 2011 and FY 2012. Subsequent legislation (American Taxpayer Relief Act of 2012, Bipartisan Budget Act of 2013, Medicare Access and CHIP Reauthorization Act of 2015, and Bipartisan Budget Act of 2018) extended the temporary changes through FY 2018. Qualifying hospitals received an add-on payment using a sliding scale ranging from the 25 percent add-on for hospitals with fewer than 200 Medicare discharges down to a 1.6667 percent add-on for hospitals with 1,500–1,599 Medicare discharges.

Hospitals cannot receive an IPPS low-volume adjustment while participating in the RCHD.

1.2.4.2 Disproportionate Share Hospital (DSH) and 340B Pricing Programs

The DSH and 340B pricing programs also involve payment add-ons available to some small, rural hospitals. The DSH program enhances payments for hospitals that serve a high share of low-income individuals, but the threshold depends on hospital size and location. The 340B program allows hospitals to purchase pharmaceuticals at lower costs or receive rebates from drug manufacturers. While Rural Community Hospital (RCH) payments do not affect these payments directly, according to the Health Resources and Services Administration (HRSA), "To be eligible to participate in the 340B Drug Pricing Program, Sole Community Hospitals must also have a disproportionate share adjustment percentage equal to or greater than 8 percent for

the most-recently filed Medicare cost report and meet the requirements of 42 USC 256b(a)(4)(L)(i)."[21]

1.2.4.3 IPPS Change for Low Wage Index Hospitals

In 2019, CMS issued a final rule (CMS-1716-F) that increased wage index values for hospitals with a wage index value below the 25th percentile wage index.[22] The wage indexes are increased by half the difference between the otherwise applicable wage index value for a qualifying hospital and the 25th percentile wage index value across all hospitals. This policy went into effect in FY 2020 and likely has affected hospitals in rural areas, which have lower wage indexes.[23] These wage indexes affect the IPPS, which in turn affects hospitals with SCH and MDH status; RCHD hospitals, however, are not subject to the policy.

1.2.5 Effect of the Public Health Emergency

Most of CMS' demonstrations and models are being affected by changes in health care delivery associated with the COVID-19 pandemic. The impact of the pandemic on rural hospitals may vary depending on factors such as increased costs for personnel and personal protective equipment, restrictions on discretionary procedures, and the number of cases in each hospital area. These factors are likely to affect evaluation results that use data from FY 2020 and FY 2021. The public health emergency does not affect the results reported in this document apart from its impact on the availability of RCHD hospital representatives to participate in key informant interviews, but the potential impact of the pandemic will be incorporated and discussed in future reports.

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[21] HRSA. (2018, May). *Sole Community Hospitals.* https://www.hrsa.gov/opa/eligibility-and-registration/hospitals/sole-community-hospitals/index.html#:~:text=To%20be%20eligible%20to%20participate,4)(L)(i)

[22] Inpatient Prospective Payment Systems for Acute Care Hospitals Final Rule, 84 F.R. 42044 (proposed August 16, 2019) (to be codified at 42 C.F.R. Parts 412, 413, and 495). https://www.federalregister.gov/documents/2019/08/16/2019-16762/medicare-program-hospital-inpatient-prospective-payment-systems-for-acute care-hospitals-and-the

[23] CMS. (2019, August 2). Fiscal Year (FY) 2020 Medicare Hospital Inpatient Prospective Payment System (IPPS) and Long-Term Acute Care Hospital (LTCH) Prospective Payment System Final Rule (CMS-1716-F) [Fact sheet]. https://www.cms.gov/newsroom/fact-sheets/fiscal-year-fy-2020-medicare-hospital-inpatient-prospective-payment-system-ipps-and-long-term-acute-0

1.3 RCHD Evaluation Research Questions and Analytical Approach Overview

As noted in Section 1.1, in September 2019 CMS selected IMPAQ International, LLC, together with its partner Mission Analytics Group and an advisory group of subject matter experts from the HFMA and the University of Iowa's RUPRI Center for Rural Health Policy Analysis, to conduct the third evaluation of the RCHD.[24] The overarching goal of the current evaluation of the RCHD is to examine the effects of the RCHD on Medicare payments and hospitals' financial condition. This evaluation report groups the research questions, listed in Exhibit 1.5, into three topic areas. Topic Area 1 (Attributes) describes the participants in the RCHD, Topic Area 2 (Payments) describes the additional payments[25] RCHD participants received, and Topic Area 3 (Impact) describes the impact that the RCHD had on participants' financial outcomes. More specifically:

- *Topic Area 1: Attributes of participant hospitals compared to eligible non-participants* characterizes RCHD hospitals in terms of their financial status and their operational and contextual characteristics and contrasts those characteristics with those of eligible non-participant hospitals.

- *Topic Area 2: Payments distributed* describes the additional payments RCHD hospitals received and explores the factors associated with the variation in those payments across participants.

- *Topic Area 3: Impact of the RCHD payments on hospital finances* estimates the impact of the RCHD on hospitals' financial condition using a quasi-experimental approach.

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[24] The results of the first RCHD evaluation are reported in the *Interim Evaluation Report of the Rural Community Hospital Demonstration* (unpublished report submitted August 30, 2011 to CMS), which studied the experience of RCHD hospitals under the initial MMA authorization. The results of the second evaluation, which focused on the experience under the ACA extension, can be found in the October 2018 *Report to Congress*, available at https://innovation.cms.gov/Files/reports/rch-rtc.pdf and in the *Rural Community Hospital Demonstration Evaluation: Expansion under the Affordable Care Act, Final Report* (unpublished report submitted September 13, 2017 to CMS).

[25] In section 1, unless otherwise stated, additional payments RCHD hospitals received is the difference between the RCHD payments a hospital received for inpatient acute care services and swing bed services for providing SNF care and the payments the hospital would have received under its previous rural status (IPPS plus SNF PPS).

Exhibit 1.5 also describes the analytic approach and data used to answer each of the research questions and identifies the section in this report where these research questions are answered.

Exhibit 1.5: Research Questions

Research Topic Area and Question	Data Type/ Source	Analytic Approach	Section in this Report
Topic Area 1: Attributes of participant hospitals compared to eligible non-participant hospitals			
a. What are the characteristics of participant hospitals, and how are they related to the design of the payment approach? Are other market or hospital factors important for understanding the characteristics of participant hospitals?	Document Review Interviews HCRIS SEER	Thematic Analysis Descriptive Statistics	4.2
b. How do participant hospitals compare to eligible but non-participant hospitals in terms of market area, staffing, utilization, and margins?	HCRIS SEER	Descriptive Statistics	4.3
c. If any hospitals left the demonstration, what were their reasons for doing so?	Interviews & Document Review	Thematic Analysis	4.4
Topic Area 2: Payments distributed: Which hospitals received what levels of reimbursement?			
a. Does the size of the RCHD payment vary by the organizational characteristics of hospitals (e.g., swing beds, independent vs. multi-chain hospital, base year costs)?	Settled Cost Reports HCRIS SEER	Multivariate Regressions	5.2
b. What payments were distributed under the demonstration to participant hospitals relative to what they would otherwise have received under IPPS?	Settled Cost Reports HCRIS	Descriptive Statistics	5.3 and 5.4
Topic Area 3: Impact of RCHD payments on hospital finances			
a. How did the demonstration affect the financial condition of participant hospitals?	HCRIS SEER	Descriptive Statistics	6.2
b. How did the demonstration affect the financial condition of participant hospitals compared to their financial condition before they joined the demonstration?	HCRIS SEER	Descriptive Statistics	6.3
c. How does the impact of the RCHD payments on the financial condition of participant hospitals compare to the financial condition experienced by eligible and similar non-participant hospitals?	Interviews HCRIS SEER	Thematic Analysis Descriptive Statistics	6.4

Exhibit 1.5: Research Questions

Research Topic Area and Question	Data Type/ Source	Analytic Approach	Section in this Report
d. Did the financial impact of the demonstration vary among the two rounds of the demonstration (impact under the demonstration initially authorized by the MMA, the extension under the ACA)?	Interviews HCRIS SEER	Thematic Analysis Multivariate DID Analysis	6.5
e. Did the impact of the demonstration on hospital finances vary by market factors (e.g., market poverty rate, number of competing inpatient providers, population density)? How did these market factors influence the payment rate and the market position and financial situation of the hospital?	HCRIS SEER	Multivariate DID Analysis	6.6
f. What share of RCHD hospital revenues (Medicare and total) are derived from SNF swing beds and how has this share changed since the start of the demonstration?	Interviews HCRIS SEER	Thematic Analysis Multivariate DID Analysis	6.7

Notes: (1) DID = Difference in Differences; HCRIS = Healthcare Cost Report Information System. SEER = Surveillance, Epidemiology, and End Results. (2) The Second Interim Evaluation Report will also investigate if the impact of the demonstration was different under the CCA extension.

The evaluation approach described here builds on and extends the methodology and findings from the prior two evaluations. The novel aspects of this evaluation are:

- **Using a multivariate analysis approach to evaluate the factors that explain why some participating hospitals receive higher additional RCHD payments than others;**

- **Using a quasi-experimental approach to estimate the *impact* of the RCHD on hospitals' financial condition and exploring whether the impact varies depending on when hospitals first joined the demonstration and based on the characteristics of the markets in which hospitals operate; and**

- **Extending the sample analyzed by including more hospitals and additional years.**

1.4 Conceptual Model for the RCHD Evaluation

The conceptual model shown in Exhibit 1.6 illustrates the relevant factors identified in the 2018 *Report to Congress* for hospitals' decisions to participate in the RCHD, how participation in the demonstration affects hospitals' payments for inpatient stays, and the hypothetical effects that RCHD payments can have on hospitals' overall financial condition.

Decision to participate in the RCHD. The left-hand side of the conceptual model shown in Exhibit 1.6 illustrates the findings included in the 2018 *Report to Congress* that the RCHD attracted predominantly hospitals with low or negative Medicare inpatient margins. However, RCHD participants' *overall* financial condition was not necessarily weaker than that of eligible non-participant hospitals, as reflected by their total profit margins, which include revenues and costs from all payers as well as investment income.

Exhibit 1.6: Rural Community Hospital Demonstration Conceptual Model
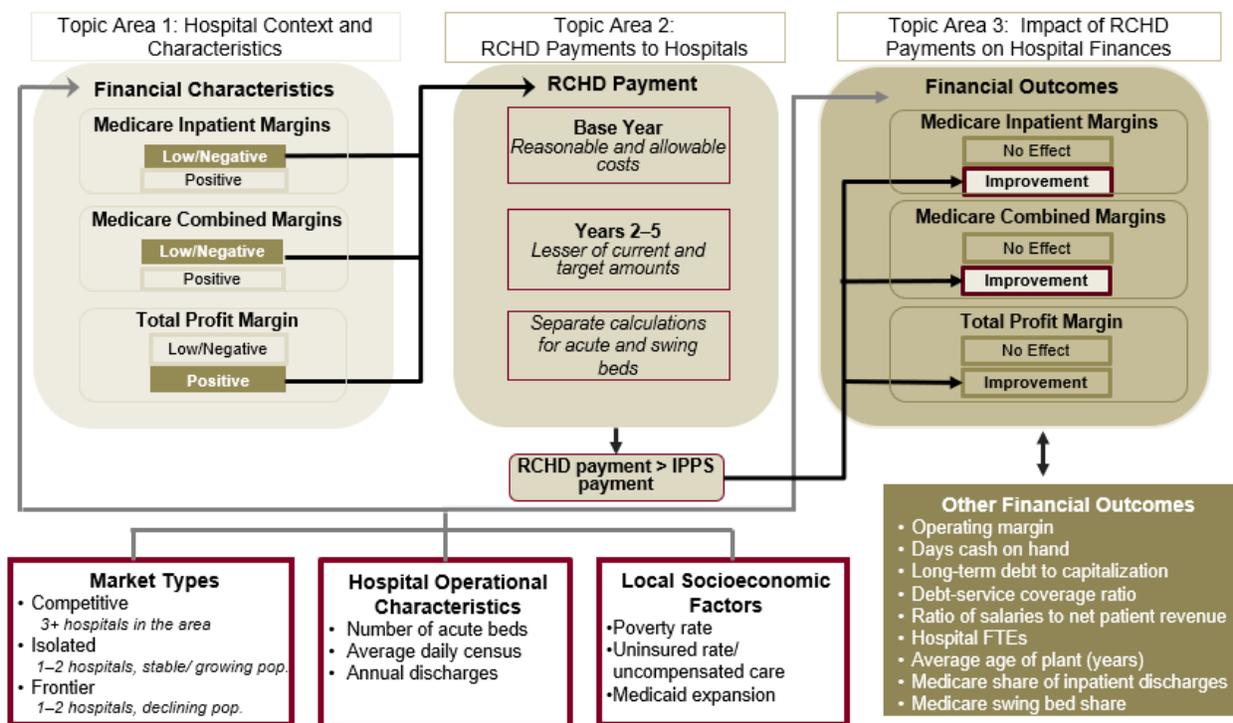
Notes: FTE = Full-Time Equivalent. Highlighted boxes in brown under Topic Area 1 denote the characteristics, identified in the 2018 Report to Congress, of the hospitals that participated in the RCHD. For example, hospitals with low/negative Medicare inpatient margins were the ones that participated, whereas hospitals with positive inpatient margins did not participate. Boxes highlighted in white under Topic Area 3 represent the hypotheses we have about the expected impact of the RCHD given how the payment mechanism works. The effect of the RCHD on total profit margins is unclear, as there is not a strong connection between Medicare inpatient margins, the outcome more directly affected by the RCHD, and total profit margins.

RCHD payments to hospitals. The middle section of the conceptual model illustrates the finding in the 2018 *Report to Congress* that hospitals that participated in the RCHD received, on average, higher Medicare inpatient payments than what they would have received under the IPPS.[26]

Impact of the RCHD on hospitals' financial condition. The right-hand side of the conceptual model shows the potential impact of the RCHD on hospitals' financial margins. The demonstration was expected to most directly affect Medicare inpatient margins through higher additional Medicare inpatient payments. Medicare combined margins are also expected to improve, as they are the sum of Medicare inpatient and outpatient margins. However, the magnitude of this improvement will depend on how large Medicare inpatient revenue and costs are relative to Medicare outpatient revenue or cost. The impact of the demonstration on total profit margins is uncertain, as total profit margins also include revenues and costs for all payers and investment income. Indeed, previous evidence shows that Medicare margins are largely unrelated to hospitals' total profit margins.[27] Other financial indicators could also improve depending on how hospitals use the additional RCHD payments they receive. The full list of outcomes that we examined is shown in Exhibit 3.1.

This theory of change is affected at every stage by contextual characteristics that include the type of market in which hospitals operate, hospitals' operational characteristics, and local socioeconomic factors. We next describe these factors in more detail.

Hospital Operational Characteristics

Hospitals' operational characteristics, such as the number of swing bed discharges or average cost per discharge, can influence the size of the RCHD payments hospitals receive. For example, as Section 1.2 describes, RCHD target amounts for each hospital are a function of the average cost per discharge in the base year, a case mix adjustment, and the number of Medicare discharges in a given year. All these elements can potentially affect the size of the RCHD reimbursement hospitals receive. Therefore, a lower proportion of swing bed discharges could contribute to lower inpatient margins.

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[26] Throughout this section this terminology includes the SNF PPS unless explicitly noted.

[27] MedPAC. (2003). Relationship among Medicare inpatient, overall Medicare, and total margins for hospitals.

Hospital characteristics for participant and non-participant hospitals with available data are analyzed in Section 4 to describe how participants compare to non-participants. These characteristics are also used to select a comparison group of similar non-participant hospitals and as covariates to estimate the impact of the RCHD on hospitals' financial condition (Section 6). Finally, we examine whether the RCHD increased participant hospitals' share of Medicare revenue from swing beds (use of swing beds is one hospital characteristic that affects RCHD payments) (Section 6.8).

Market Typology

Following the approach used in the 2018 *Report to Congress,* we summarized the contextual characteristics of hospitals in terms of population demographics, economic conditions, and the local health care system by classifying hospitals as being in competitive, frontier, or isolated markets. These 3 categories are based on the number of nearby hospitals and whether the population in the area is declining. According to the 2018 *Report to Congress,* the financial condition of hospitals eligible for the RCHD varied by the type of market where the hospital was located. Hospitals in Competitive markets tended to have more robust margins reflecting their larger market populations, but this was tempered by the presence of a larger number of competing hospitals. Hospitals in Frontier markets with growing populations and limited competition exhibited the strongest total profit margins. Hospitals in Isolated markets, which tend to have smaller and shrinking populations, had the most tenuous finances.[28]

In this report we follow the approach in the 2018 *Report to Congress* and define Competitive markets as those that have three or more hospitals within 35 miles, Frontier markets as those that have low levels of competition (a maximum of two hospitals within 35 miles) and stable or growing county-level population growth over a five-year period, and Isolated markets as those that have low levels of competition and declining county-level population growth over a five-year period.[29]

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[28] CMS. (2018, October). *Report to Congress: Rural Community Hospital Demonstration,* p. 13. https://innovation.cms.gov/files/reports/rch-rtc.pdf

[29] The market typology used in this report follows closely the typology in the 2018 *Report to Congress,* with only small variations implemented to account for the availability of information during the longer period of analysis covered by this report. The 2018 *Report to Congress* uses population change at the market level over a 10-year window, instead of population changes during five-year windows at the county level.

We investigate whether the variation in additional RCHD payments can be explained by the type of market in which hospitals operate in Section 5. In Section 6, we investigate whether the impact of the demonstration varies depending on the markets in which hospitals operate. Hospitals in Competitive markets are likely to be located in areas with larger patient populations; thus, the additional resources hospitals receive through the RCHD may have a multiplicative effect that allows the hospital to serve more patients and improve its financial condition. Hospitals in Frontier markets are in a similar situation with a relatively larger pool of potential patients. In contrast, hospitals in Isolated markets serve areas with shrinking populations that tend to be more economically disadvantaged. The RCHD might prevent hospital closures in Isolated areas, but the multiplicative effect of the demonstration is more limited, as there is more limited room for expanding their patient population.

Local Socioeconomic Factors

The market typology is a useful way to classify hospitals in different and distinct groups depending on a few salient characteristics of the markets in which they operate. However, there are other socioeconomic factors not fully captured by this market typology that could affect hospitals' financial conditions. For example, as shown graphically in the conceptual model (Exhibit 1.6), a state's poverty rate and the proportion of uninsured residents could mean that a hospital provides more uncompensated care than hospitals that operate in more economically stable states. These

An important contextual characteristic for future investigation will be the effect of the COVID-19 epidemic on hospitals' financial outcome. The second interim evaluation design report will include a discussion of how COVID-19 can affect the RCHD and the evaluation.

factors also interact with a hospital's market typology and operational characteristics, as shown in the conceptual model. Variables that measure local socioeconomic factors are listed in Exhibit 3.2 and are analyzed in Section 4 to describe how participants and non-participants compare. A subset of these characteristics is used to select a comparison group of similar non-participant hospitals and as covariates to estimate the impact of the RCHD on hospitals' financial condition (Section 6).

Cohort Analysis

Although not shown in the conceptual model above, the impact of the RCHD on participating hospitals could vary depending on when they first the joined the demonstration (either under the MMA initial authorization or under the ACA authorization extension). As noted in the introduction, the MMA made the RCHD available only to hospitals in the 10 least densely populated states, whereas under the ACA authorization extension, hospitals from the 20 least densely populated states were eligible to participate. Recognizing that there could be different effects for hospitals in these cohorts, we included a cohort analysis in this evaluation.

Hospitals that first joined the demonstration as part of the MMA initial authorization are part of the MMA cohort, whereas hospitals that first joined under the ACA extension are part of the ACA cohort. Section 4 describes hospitals' financial condition, organizational characteristics, markets in which they operate, and local socioeconomic conditions for hospitals separated by cohort of participation and also combined. Section 6 describes whether the effects of the demonstration vary depending on a hospital's cohort. The goal of the cohort analysis was to determine whether there was observable variation between hospitals based on the length of time hospitals were part of the demonstration, or due to differences in hospitals' own characteristics or the contextual characteristics in which they operate.

1.5 Hospitals Included in This Evaluation Report

RCHD hospitals in this report are classified into the following cohorts based on the legislative authorization in place when hospitals first joined the demonstration:

- **MMA cohort**: Includes 17 hospitals that first joined the RCHD under the MMA initial authorization.

- **ACA cohort**: Includes 16 hospitals that first joined the RCHD under the ACA authorized extension.

- **CCA cohort:** Includes 12 hospitals that first joined the RCHD under the CCA authorized extension.

Each RCHD hospital belongs to only one cohort, even if it participated in the RCHD under multiple authorities.

This report includes *quantitative* information for the 33 hospitals that are part of the MMA and ACA cohorts. Cost report data after FY 2018 were mostly preliminary as of the writing of this report, therefore, quantitative analysis could not be done for the CCA cohort.[30] However, the CCA cohort is included as part of the *qualitative* data collection only.

Exhibit 1.7 lists the 45 hospitals that have participated in the RCHD, the cohort to which they belong, the state in which each hospital is located, and the phase(s) of the demonstration in which the hospital participated. The exhibit shows that the 17 hospitals that are part of the MMA cohort include 10 hospitals that at some point during the period of analysis withdrew, closed, or decided not to participate in an RCHD extension, as well as seven hospitals that participated either under the ACA or CCA extensions. It also shows that the 16 hospitals that are part of the ACA cohort include three hospitals that at some point during the period of analysis withdrew, closed, or decided not to participate of the CCA extension and 13 hospitals that did participate under the CCA extension.

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[30] Hospital cost reports have several statuses that include "as submitted", "settled without audit", "settled with audit", reopened, and amended. The most reviewed cost-report (i.e., settled) the more reliable is considered. As mentioned in Section 2.1.1, as of the July 2020 HCRIS update, 80 percent of all FY 2018 reports for hospitals were still in the "as submitted" state, and yet subject to change.

Exhibit 1.7: Hospital Participation by Authorization in the RCHD
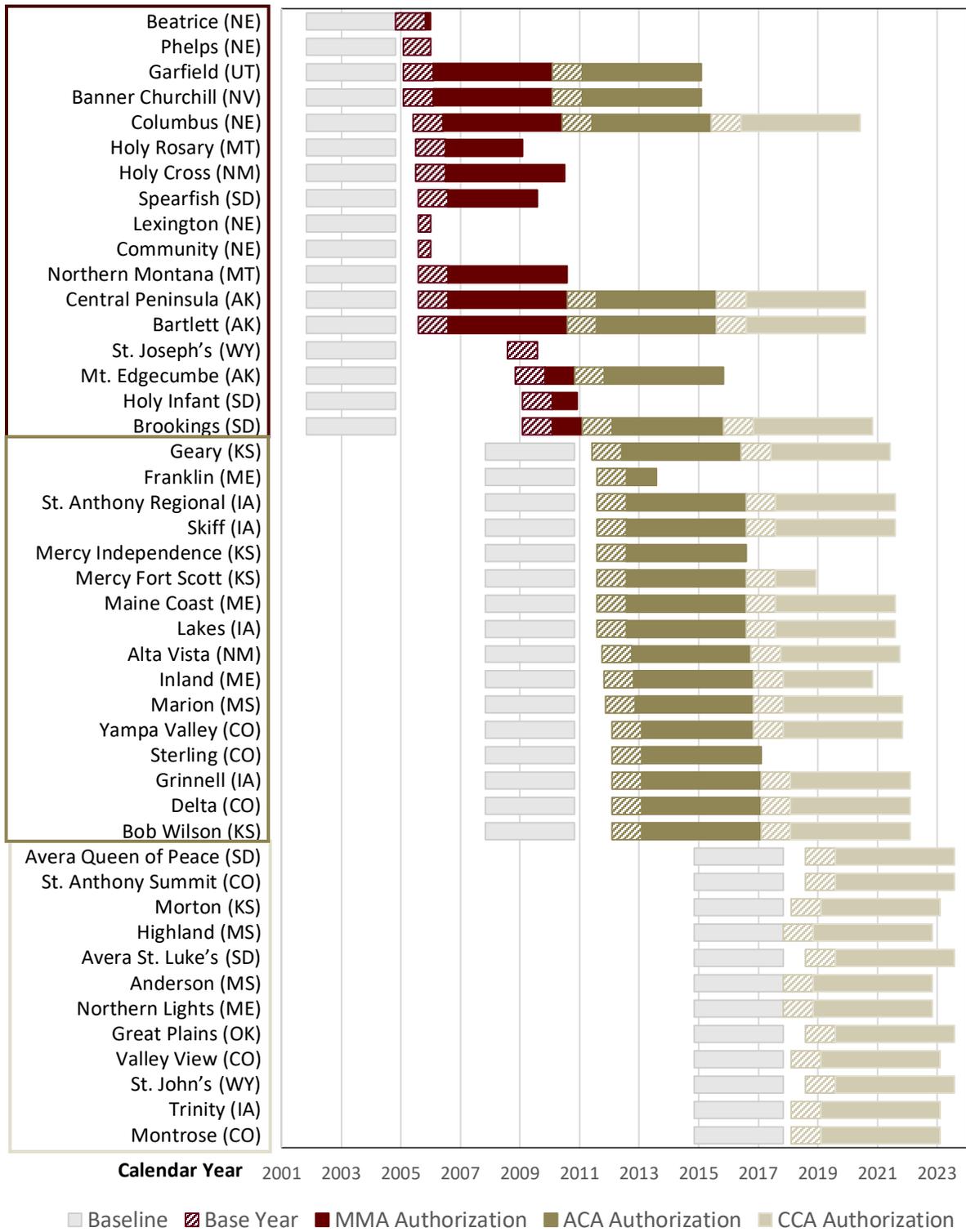
Notes: Lexington, Community, and St. Joseph's Hospitals dropped out of the RCHD before the MMA phase began. The color surrounding the hospital names corresponds to the cohort in which the hospital entered the program. The exhibit shows boxed in red the names of the 17 hospitals that are part of the MMA cohort, followed by the 16 hospitals that are part of the ACA cohort and the 12 hospitals that are part of the CCA cohort.

Exhibit 1.8 describes the hospitals analyzed in each topic area and the restrictions applied to select them. The number of RCHD hospitals varies slightly across topic areas depending on the availability of information and the methodological considerations to answer the research questions adequately under each topic area. Topic Area 1 (Attributes) includes 33 RCHD hospitals, and Topic Area 2 (Payments) includes 32 RCHD hospitals because one hospital (St. Joseph's) was missing its cost report. Topic Area 3 (Impact) includes 29 RCHD hospitals. One hospital (Mt. Edgecumbe) was excluded because it had missing Medicare inpatient margins, a key outcome for Topic Area 3 (Impact), and three other RCHD hospitals were excluded (Phelps Memorial Health Center, Lexington Regional Health Center, and Community Hospital Association of McCook) because they became CAHs and left the RCHD by FY 2006. These latter three hospitals were excluded from Topic Area 3 (Impact) to avoid potential DID estimate bias stemming from RCHD and comparison group compositional changes between FY 2004 and FY 2006. See Section 3.1.2.4 for full details on the rationale for this restriction.

Eligible Non-Participant Hospitals and Comparison Group Hospitals

Topic Areas 1 and 3 report results relative to a reference group. The reference group for Topic Area 1 (Attributes) consists of *eligible non-participant hospitals.* These are defined as hospitals not participating in the RCHD that satisfy the RCHD eligibility criteria, meaning they are rural, not eligible to be CAHs, have fewer than 51 hospital beds, and provide 24-hour emergency services. In Topic Area 3 (Impact), the results are reported relative to a *comparison group* of hospitals that had characteristics similar to those of RCHD hospitals at baseline. The purpose of this comparison group is to serve as the counterfactual for the RCHD group. In other words, the comparison group provides information about what would have happened to the RCHD hospitals in the absence of the demonstration. Section 6.3 describes the construction of this comparison group.

Exhibit 1.8: RCHD and Reference Hospitals Included in Each Topic Area

| Topic Area | RCHD Hospitals | | Reference Hospitals | |
	Number of Hospitals (1)	Restrictions Applied (2)	Number of Hospitals (3)	Restrictions Applied (4)
Topic Area 1: Attributes	33 Hospitals MMA cohort: 17 ACA cohort: 16	None	Demonstration: 742 Hospitals (approx.) Baseline: 1,063 Hospitals	Restricted to hospitals that satisfied the RCHD eligibility criteria (rural, not eligible to be CAHs, fewer than 51 beds, and hospitals that provide 24-hour emergency services)
Topic Area 2: Payments *(Regression Analysis Only)*	32 Hospitals MMA cohort: 16 ACA cohort: 16	Hospitals missing all cost report data in a year removed	Not applicable because reference hospitals are not part of Topic Area 2 analysis	
Topic Area 3: Impact	29 Hospitals MMA cohort: 13 ACA cohort: 16	Removed hospitals that became a CAH in or before FY 2006* or did not have baseline data for Medicare inpatient margins	511 Hospitals	Before using entropy balancing to construct the comparison group, we excluded hospitals among the universe of non-participant hospitals (1,063 hospitals) that: • Became CAHs between FY 2000 and 2006; • Were a CAH in every year in our sample; and/or • Did not satisfy the RCHD eligibility restrictions in the baseline period.

Notes: Approximate number of reference hospitals listed varies by outcome for baseline years. More details about the comparison group construction can be found in Section 6.3.

1.6 Period of Analysis

The period of analysis for this report covers FY 2002 to FY 2017. This period of analysis is further divided into a baseline period, which is relevant for Topic Area 1 (Attributes) and Topic Area 3 (Impact), and a demonstration period, which is relevant for all topic areas.

Baseline period. Each cohort of hospitals has a different baseline period, defined as the three fiscal years prior to the start of the cohort. For the MMA cohort, the baseline period is FY 2002–2004, because the earliest start year of a hospital in the MMA cohort is FY 2005. For the ACA cohort the baseline period is FY 2008–2010. All RCHD hospitals within a given cohort, including those that continue under a given extension, have the same baseline period. For instance, hospitals that first joined under the MMA have a baseline period of FY 2002–2004 even if they continued in the RCHD through the ACA authorization. Exhibit 1.7 shows the baseline period for each hospital.

Demonstration period. The demonstration period covers FY 2005 to FY 2017. Because hospitals joined the RCHD at different points in time, the demonstration period for each hospital starts with the first FY of participation in the RCHD. Some of the analyses in Topic Area 2 (Payments) further divide the demonstration period into an initial MMA authorization period, which covers FY 2005–2009; the ACA authorization extension, which includes FY 2010–2014; and the CCA authorization extension, which covers FY 2015–2017. Note that in the CCA authorization extension period, only hospitals that joined the demonstration during the initial MMA authorization or the ACA authorization extension were included in the analysis. Cost report data after FY 2017 were either not yet available or still subject to change as explained in more detail in Section 2.1.1.

2 DATA SOURCES

This section discusses the primary and secondary data sources used in this evaluation.

2.1 Primary Data

We built our understanding of the experiences and perspectives of RCHD hospitals under the CCA authorization extension by conducting telephone interviews with hospital administrators and reviewing relevant documents. The primary data mainly supported the analyses under Topic Area 1 (Attributes), helping us to understand the characteristics of participating hospitals and how they relate to the payment approach and to hospitals' decisions to participate in the RCHD. The primary data also provided context for the quantitative analyses conducted under Topic Area 2 (Payments) and Topic Area 3 (Impact), such as aspects of hospital operations that may have contributed to a change in RCHD payments (e.g., change in case mix, increasing costs). Similarly, we captured hospitals' perceptions of the RCHD's impact on financial performance and community benefits, including the uses of RCHD funds and plans for sustainability after the end of the demonstration. Finally, for hospitals that decided to withdraw from the demonstration, the interviews shed light on the decision-making process and the value of the RCHD compared to alternative payment mechanisms.

2.1.1 Key Informant Interviews

Between December 2019 and April 2020, the evaluation team conducted 24 interviews related to 26 RCHD hospitals, 2 of which belong to the MMA cohort, 12 to the ACA cohort and 12 that belong to the CCA cohort. Some hospitals within the same health care system participated in a joint interview (Marion and Highland from the Forrest Health System, and Inland and Maine Coast from the Northern Light System). We were unable to interview any representatives from three hospitals—one declined to participate in an interview, another cancelled the interview due to the COVID-19 pandemic, and the third did not participate in the scheduled interview and did not respond to follow-up requests. Given the COVID-19 pandemic and hospitals' essential role in treating individuals with the illness, we decided to delay the interviews and follow-up communication.

We used three interview protocols that reflected the hospital cohorts and phases of participation (new, continuing, exiting):

- Initial interviews with hospitals that first joined the RCHD under the CCA authorization extension (New hospitals/CCA cohort).

- Initial interviews with hospitals that first joined the RCHD under the ACA authorization and continued their participation under the CCA authorization (Continuing Hospitals/ ACA Cohort).

- Exit interviews with hospitals that first joined the RCHD under the MMA initial authorization and continued their participation under the ACA and CCA extensions (Exiting Hospitals/ MMA Cohort). These hospitals began reaching the end of their respective RCHD participation periods in 2020.[31]

Exhibit 2.1 describes how the interview protocols addressed each major discussion topic area. In some cases, the discussion topic area was a major focus of the interview; in others, the interviews were used to update information gathered in past evaluations. The interview guides appear in Appendix B, and the qualitative coding guide can be found in Appendix C.

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[31] The COVID-19 Relief Act of 2021 extended the RCHD for 5 more years. The potential impacts of this extension on the evaluation design will be discussed in the *Second Interim Evaluation Report*.

Exhibit 2.1: Summary of Discussion Topics Covered by Each Interview Protocol			
	Interview Protocols by Participation Phase/Cohort		
Discussion Topic Area	**New Hospitals/CCA Cohort**	**Continuing Hospitals/ ACA Cohort**	**Exiting Hospitals/ MMA Cohort**
Hospital operations and surrounding environment	Major focus given that data were not previously collected	Updates only	Updates only
Decision to participate and consideration of other payment options	Important focus given that data were not previously collected	Focus on decision to *continue* participation under the CCA authorization extension	Focus on decision to *continue* participation under the CCA authorization extension
Aspects of operations for RCHD hospitals that affect payments	Minor focus given that hospitals may not have extensive experience with the RCHD	Major focus given considerable experience with the RCHD and rebasing under the CCA authorization extension	Major focus given considerable experience with the RCHD and rebasing under the CCA authorization extension
Impact of the RCHD payments on Medicare inpatient margins, overall finances, and community benefits	Minor focus given that hospitals may not have sufficient experience with the RCHD	Major focus given considerable experience with the RCHD	Major focus given considerable experience with the RCHD
Sustainability plans after the RCHD ends	Not addressed	Not addressed	Major focus

2.1.2 Document Review

Prior to the interviews, the evaluation team gained a thorough understanding of hospital finances and operations and the general market environment by reviewing the hospitals' RCHD applications, hospital websites, and FY 2017 Healthcare Cost Report Information System (HCRIS) data, including Medicare inpatient margins, total profit margins, full-time equivalents (FTEs), and acute and swing bed discharges. For the interviews with staff from hospitals that were part of the ACA and MMA cohorts, we also reviewed interview summaries and analyses developed in the previous evaluations. In preparation for the interviews, we abstracted information from these sources and developed hospital-specific questions. For example, if a hospital indicated in a previous interview that a competitor was closing, we probed about the impact this event had on the hospital's overall financial performance.

2.2 Secondary Data

Numerous secondary data sources were used to evaluate hospital and market characteristics, as well as financial information for both the RCHD hospitals and the comparison group of small rural hospitals. Except for settled cost reports obtained directly from the MACs for the RCHD hospitals, all secondary data sources are publicly available and do not contain private information. Exhibit 2.2 summarizes the secondary data sources we used.

Exhibit 2.2: Summary of Secondary Data Used Across Topic Areas			
	Use Across Topic Areas		
Data Source	**Topic Area 1: Attributes**	**Topic Area 2: Payments**	**Topic Area 3: Impact**
Healthcare Cost Report Information System (HCRIS)	Hospitals' margins Hospitals' characteristics	Market typology (multivariate regression) Hospitals' characteristics (sensitivity analysis)	Hospitals' margins (outcomes) Hospitals' characteristics (matching covariates and control variables)
Settled Cost Reports	N/A	RCHD payments	N/A
Hospital/Medicare IPPS Impact File	Rural status to determine eligible non-participants and comparison group	N/A	Rural status to determine eligible non-participants and comparison group
Surveillance, Epidemiology, and End Results (SEER)	County-level characteristics	County-level characteristics (sensitivity analysis)	County-level characteristics (matching covariates and control variables) Market typology (matching variable and stratification variable)

Notes: *N/A = not applicable because the data source was not used for that topic area.*

Below we describe each secondary data source in greater detail.

2.2.1 Healthcare Cost Report Information System

HCRIS was used to provide the following types of information:

- Hospital financial outcomes (described in more detail in Exhibit 3.1)
- Measures of hospital characteristics (described in more detail in Exhibit 3.2) including:
  - Patient volumes and characteristics
  - Hospital staffing
  - Hospital capacity

- - Organizational characteristics
  - Other hospital characteristics
- Cost and charges, in total and for Medicare

HCRIS files are created from the annual cost reports submitted by hospitals and reviewed by the CMS MACs. Annual cost reports are the only source of information that provides the level of detail required by the analyses. HCRIS files typically become publicly available nine months after the end of the cost reporting year. Because of the audit and settlement process, data included in HCRIS may change over time for previously submitted cost reports. Thus, the data are updated quarterly as the cost reports are audited and settled. For this reason, the financial data in HCRIS are more stable two to three years after the end of a hospital's fiscal year. As of the July 2020 HCRIS update, 80 percent of all FY 2018 reports for hospitals were still in the "as submitted" state. For FY 2017, 37 percent of reports were in this state, with the remaining reports shown as either audited or settled. Our analysis suggests that information that has been audited is largely reliable, and therefore the analyses in this report only use information for FYs up to and including FY 2017.

2.2.2 Settled Cost Reports for RCHD Hospitals

The MACs are responsible for calculating the reasonable costs and the target amounts and reconciling the interim payments based on the lesser of these amounts. The RCHD payments are included in the settled cost reports, which contain a special worksheet (worksheet E-H), to calculate the target amount and determine whether the hospital will receive the target amount or reasonable costs. This worksheet is now included in the publicly available HCRIS data, but not the supporting documentation. The final settled cost reports contain the final reconciled Medicare inpatient revenues that were used to compare the IPPS and RCHD payments.

2.2.3 Surveillance, Epidemiology, and End Results (SEER)

County level population characteristics were obtained from the National Cancer Institute SEER data. These characteristics include the percentage of the population 65 years of age and older, the percentage of the population in poverty, and the total population. In addition, we calculated population density using the total county population divided by the number of square miles in the county.

3 METHODOLOGY

In this section, we discuss the quantitative and qualitative evaluation methodologies used to assess the effects of the RCHD. We used a mixed-methods approach to find answers to the various research questions of interest.   We tailored the response to each research question using the most suitable methodology (qualitative or quantitative) to answer it. This approach also enabled us to triangulate the results from one type of analysis (e.g., quantitative) with data from another source, which will increase confidence in our conclusions. Finally, the qualitative analysis helps to provide background and context for the results from the quantitative analysis and to explore the mechanisms driving the results. Sections 4, 5, and 6 describe how we are implementing the evaluation methodologies to answer each of the evaluation research questions.

3.1 Quantitative Methodology

This section describes the quantitative evaluation methodology used in the evaluation. Section 3.1.1 describes the evaluation measures used in the analysis. Section 3.1.2 describes the evaluation methods, including the period of analysis and the hospitals included in this report.

3.1.1 Evaluation Measures

This section discusses the evaluation outcomes and the variables that were used to measure hospital characteristics and the context in which hospitals operate. These variables were analyzed descriptively to answer research questions under Topic Area 1 (Attributes). A subset of the contextual and hospital characteristics were used as covariates in the multivariate regressions used to produce estimates for the questions under Topic Area 2 (Payments) and Topic Area 3 (Impact) and as matching covariates to find a comparison group for the questions in Topic Area 3 (Impact).

3.1.1.1 Hospital Financial Outcomes

Exhibit 3.1 describes the specifications used to calculate financial outcomes analyzed in this evaluation. Under Topic Area 1 (Attributes), outcomes were analyzed using descriptive statistics to summarize the financial condition of RCHD hospitals and how they compared to eligible non-participants, both prior to the start of the demonstration and during the demonstration. Under Topic Area 2 (Payments), we summarized the additional RCHD reimbursements for acute care and swing beds over IPPS that hospitals received using descriptive statistics. In addition, in this topic area, we analyzed how different components that are inputs to the target amount affect the outcome additional RCHD payments over IPPS. Under Topic Area 3 (Impact), the outcomes were used as the dependent variables for the DID regressions in the impact analysis.

Exhibit 3.1 shows four hospital margin outcomes (total profit margin, operating margin, Medicare inpatient margin, and Medicare combined margin) that serve as profitability indicators. We also analyzed several measures that capture financial performance more broadly, such as days cash on hand, long-term debt-to-capitalization ratio, and the ratio of salaries to net patient revenue. These other financial indicators measure hospital liquidity, debt, capital structure, and age of physical plant. We calculated these measures using HCRIS fiscal year data for each hospital. Additionally, we analyzed Medicare revenue measures such as Medicare share of inpatient discharges, Medicare share of inpatient days, and Medicare swing bed revenue share. Medicare share of inpatient discharges or days indicates hospitals' dependence on Medicare admissions. Medicare swing bed revenue share reflects the impact of the demonstration on hospitals' use of swing beds. Under Topic Area 2 (Payments), we examined how the characteristics of participant hospitals are related to the additional RCHD payments over IPPS.

Each outcome measure is described in more detail below:

- *Medicare inpatient margin* measures Medicare inpatient profits as a percentage of Medicare inpatient revenue. Positive values indicate that allowable Medicare inpatient costs are less than total Medicare inpatient revenue; negative values indicate that allowable Medicare inpatient costs are greater than total Medicare inpatient revenue. This measure includes SNF care delivered in swing beds.

- *Medicare combined margin* measures total Medicare profits as a percentage of total Medicare revenue. Total Medicare margins include both inpatient and outpatient revenue and costs. Positive values indicate profits, and negative values indicate loss.

- *Total profit margin* measures the percentage of total revenues from all sources that is profit or loss. A positive value indicates that total expenses are less than total revenues (a profit or positive net income). A negative value indicates that total expenses are greater than total revenues (a loss or negative net income). Total profit margin include revenues and costs from all payers, as well as investment income.

- *Operating margin* measures the percentage of operating revenues that is profit or loss. A positive value indicates that total operating expenses are less than operating revenues (an operating profit). A negative value indicates that total operating expenses are greater than operating revenues (an operating loss). Operating revenues are a sum of net patient revenues and other revenue such from the rental of hospital space.

- *Days cash on hand (DCOH)* is a measure of liquidity that broadly represents the number of days a hospital can continue to pay its operating expenses with the current cash it has available. DCOH is a criterion used by lenders and rating agencies to gauge the financial health of hospitals.[32] While very high levels of DCOH may indicate that cash is not being deployed to areas of the business generating higher returns, generally the higher the DCOH, the better hospitals are able to weather circumstances such as unexpected changes in admission rates or natural calamities and thus avoid closure.[33]

- The *long-term debt-to-capitalization ratio,* expressed as a percentage, shows how much debt a hospital has compared to the hospital's overall equity. Higher values indicate worse hospital financial positions because they imply a greater reliance on debt financing and a reduced ability to carry additional debt. A greater debt service burden also increases a hospital's sensitivity to sudden changes in service volume or payer mix. High-performing hospitals rely less on debt and more on equity, and higher bond ratings are usually associated with lower long-term debt to capitalization values.

- The *debt-service coverage ratio* indicates the organization's ability to meet its debt repayments and is typically a measure placed in bond covenants. It indicates the ability

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[32] Jacob, D., & Hinkle, S. (2018, September 27). *Solving the "days cash on hand yield dilemma" for hospitals and medical clinics in a low interest rate environment.* Aldrich: Insights. https://aldrichadvisors.com/healthcare/days-cash-hand-yield-dilemma

[33] Allen, J. (2018, May 5). How many days cash on hand should a hospital have? *The Hospital Medical Director.* https://hospitalmedicaldirector.com/how-many-days-cash-on-hand-should-a-hospital-have

of a hospital to take on additional debt for investments. A higher ratio indicates a stronger financial position. [34]

- The *ratio of salaries to net patient revenue,* expressed as a percentage, is an important indicator of the expense structure of hospitals. Higher values imply lower staffing efficiency on the part of hospitals, which is detrimental to hospital finances.[35]

- *Hospital FTEs per occupied bed*, expressed as a ratio, is a measure of the efficiency of the provision of healthcare services. Higher values of FTEs per occupied bed imply that the hospital is spending more resources than other hospitals to provide health care services to the same number of beds. A decline in FTEs per occupied bed indicates an increase in the efficiency of the provision of health care services, though extremely low values could also reflect lower quality of care.

- *Average age of physical plant* (years) indicates the financial age of the fixed assets of the hospital. The older the average age of the plant, the greater the short-term need for capital investments.[36]

- *Medicare share of inpatient discharges* and *Medicare share of inpatient days*, expressed as percentages, are measures of hospitals' dependence on Medicare reimbursement. A decline in Medicare's share of discharges/inpatient days indicates reduced dependence on Medicare and an increase in the share of Medicaid or commercial payers

- *Medicare swing bed revenue share,* expressed as a percentage, is a measure of how much Medicare inpatient revenue is coming from SNF care delivered in swing beds.

- *Additional RCHD Payments over IPPS (plus SNF PPS)* is expressed in dollar terms and is the difference between the total RCHD reimbursement (sum of the acute care and

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[34] When conducting data quality checks, we found that the debt-service coverage ratio outcome had a large amount of missing data and the non-missing data had much higher variance than all other outcomes. Therefore, we consider the impacts of the demonstration on this outcome unreliable. These data quality issues and the results we obtained for this outcome are discussed in Appendix F.

[35] Johnson, J. M. (2015). *Critical Access Hospitals: Top 10 key financial indicators.* National Rural Health Resource Center.

[36] HFMA. (2012, October 17). *Key hospital financial statistics and ratio medians: Glossary of formulas.* https://www.hfma.org/topics/research_reports/1113.html

swing bed reimbursements hospitals received under RCHD) and the sum of the IPPS and SNF PPS payments that the hospital would have received under its previous rural hospital status. The larger the positive difference, the more a hospital benefits from participating in the demonstration. A negative difference indicates that the hospital can earn higher reimbursements by going back to its original rural hospital status than by participating in the demonstration.

- *Percent increase in RCHD payments over IPPS (plus SNF PPS)* measures the additional reimbursements from RCHD in percentage terms. In the ratio, the numerator is the additional RCHD payments over IPPS (plus SNF PPS) and the denominator is the IPPS and SNF PPS payments the hospital would have received under its previous rural status. A higher percentage value indicates that hospitals received larger RCHD payments relative to payments they would have received under previous rural status.

- *Additional RCHD swing bed payments over SNF PPS* is expressed in dollar terms and is the difference between the RCHD reimbursement for swing beds and the SNF PPS payments that the hospital would have received under its previous rural hospital status. The larger the difference, the more the hospital benefits from swing bed service reimbursements as a RCHD participant.

- *Swing bed share of additional RCHD payments over IPPS (plus SNF PPS)* is expressed in percentage terms and measures the share of additional RCHD payments (sum of acute care and swing bed reimbursements under RCHD) over IPPS that is attributed to RCHD swing bed reimbursements over SNF PPS across all hospitals in the given fiscal year. A higher swing bed share of additional payments indicates that additional RCHD swing bed reimbursements play a larger role in the additional RCHD reimbursements over IPPS.

- *Per-Discharge Average Additional RCHD Swing Bed Payments over SNF PPS* is expressed in dollar terms. First, the additional RCHD swing bed payments over SNF PPS per swing bed discharge for each participating hospital in a given fiscal year was computed. Then an average of the per discharge additional RCHD swing bed payments over SNF PPS was computed across all hospitals with swing bed discharges in the given fiscal year. A larger amount indicates higher average RCHD swing bed reimbursements per swing bed discharge.

Exhibit 3.1: Evaluation Outcome Specifications

Measure	Specification
Medicare margins	
Medicare inpatient margin[†,‡]	$\left(\dfrac{\text{Medicare inpatient revenue - Medicare inpatient costs}}{\text{Medicare inpatient revenue}}\right) * 100$
Medicare combined margin[†,‡]	$\left(\dfrac{\text{Medicare inpatient \& outpatient revenue} - \text{Medicare inpatient \& outpatient costs}}{\text{Medicare inpatient \& outpatient revenue}}\right) * 100$
Overall margins	
Total profit margin[*,†]	$\left(\dfrac{\text{Net income}}{\text{Net patient revenue} + \text{Total other income}}\right) * 100$
Operating margin[*,†]	$\left(\dfrac{\text{Net patient revenue} + \text{Other revenue} - \text{Total operating expenses}}{\text{Net patient revenue} + \text{Other revenue}}\right) * 100$
Capital investment indicator	
Average age of physical plant[*,¥]	$\dfrac{\text{Accumulated depreciation}}{\text{Depreciation expense} * \left(\dfrac{365}{\text{Days in period}}\right)}$
Other financial indicators	
Days cash on hand[*]	$\dfrac{(\text{Cash} + \text{Temporary investments} + \text{Investments}) * \text{Days in period}}{\text{Total expenses} - \text{Depreciation}}$
Long-term debt-to-capitalization[*]	$\left(\dfrac{\text{Long-term debt}}{\text{Long-term debt} + \text{Net assets}}\right) * 100$
Debt-service coverage ratio[*]	$\dfrac{\text{Net income} + \text{Depreciation} + \text{Interest expense}}{\text{Notes and loans payable (short-term)} * \left(\dfrac{365}{\text{Days in period}}\right) + \text{Interest expense}}$
Ratio of salaries to net patient revenue[*]	$\left(\dfrac{\text{Salary expense}}{\text{Net patient revenue}}\right) * 100$
Hospital FTEs per occupied bed[§]	$\dfrac{\text{Number of FTEs}}{\text{Adjusted occupied beds**}}$
Medicare revenue indicators	
Medicare share of inpatient discharges	$\left(\dfrac{\text{Medicare discharges}}{\text{Total discharges}}\right) * 100$

Exhibit 3.1: Evaluation Outcome Specifications

Measure	Specification
Medicare share of inpatient days*	$\left(\dfrac{\text{Medicare inpatient days}}{\text{Total inpatient days} - \text{Nursery bed days} - \text{Nursing Facility (NF) swing bed days}}\right) * 100$
Medicare swing bed revenue share	$\left(\dfrac{\text{Medicare swing bed revenue}}{\text{Medicare inpatient revenue}}\right) * 100$
RCHD payments	
Additional RCHD payments*** over IPPS (plus SNF PPS)	$\text{RCHD payments}_{FY} - (\text{Medicare IPPS payments}_{FY} + \text{Medicare SNF PPS payments}_{FY})$
Percent increase in RCHD payments over IPPS (plus SNF PPS)	$\left(\dfrac{\text{RCHD payments over IPPS plus SNF PPS}}{\text{IPPS plus SNF PPS reimbursement}}\right)_{FY}\left(\dfrac{1}{n_{FY}}\right) * 100$ where n_{FY} is number of hospitals in FY
Additional RCHD swing bed payments over SNF PPS	$\text{RCHD swing bed payments}_{FY} - \text{Medicare SNF PPS payments}_{FY}$
Swing bed share of additional RCHD payments over IPPS (plus SNF PPS)	$\dfrac{\sum_{n=1}^{N} \text{RCHD swing bed payments over SNF PPS}_{FY}}{\sum_{n=1}^{N} \text{RCHD payments over IPPS plus SNF PPS}_{FY}} * 100$
Per-Discharge Average Additional RCHD Swing Bed Payments over SNF PPS	$\dfrac{\sum_{n=1}^{N}\left[\text{Additional RCHD swing bed payments over SNF PPS}_{FY} / Swing\ Bed\ Discharges_{FY}\right]}{N_{swing\ beds, FY}}$

Notes & Sources: (1)* Definitions for these measures are from the Flex Monitoring Team's primer titled "How State Flex Coordinators Can Use Critical Access Hospital Measurement & Performance Assessment System (CAHMPAS) Data" and HCRIS. (2) † In all analyses in this report, these outcomes are winsorized at -100 and 100. This means that any values of this outcome for a hospital year that are greater than 100 are set to 100, and any values less than -100 for a hospital year are set to -100. (3) ‡ Definitions for these measures are from MedPAC definitions and HCRIS. (4) § In all analyses in this report, this outcome is winsorized at the 99th percentile. This means that any value of this outcome for a hospital year that is greater than the 99th percentile is set to the 99th percentile. (5) ** (Inpatient days – NF swing days – Nursery days) * (Total patient revenue / (Total inpatient revenue – Inpatient NF revenue – Other long-term care revenue)) / Days in period. (6) *** Payments include RCHD Medicare inpatient acute care and swing bed payments (7) ¥ In all analyses in this report, this outcome is winsorized at 60. This means that any value of this outcome for a hospital year that is greater than 60 is set to 60.

3.1.1.2 Hospital Operational and Contextual Characteristics

Exhibit 3.2 lists the variables we used to measure hospital operational and contextual characteristics. As described in the conceptual model in Section 1.4, these variables may determine hospitals' use of RCHD funds and their impact on hospital financial outcomes as well as on community benefits.

Under Topic Area 1 (Attributes), we used t-tests to compare means of these variables across RCHD hospitals and eligible non-participants, during the baseline period, to understand which characteristics were associated with hospitals' decision to participate in the demonstration. We also used similar t-tests to compare RCHD hospitals with non-participants during the demonstration period to understand characteristics that may have changed as a result of the demonstration or on account of contemporaneous changes exogenous to the demonstration.

Under Topic Area 2 (Payments), we explored how the market area category was associated with the RCHD payments over IPPS that hospitals received from FY 2005 to FY 2017 by (1) presenting the percentages of hospitals from the different market categories stratified by low (Tercile 1), medium (Tercile 2), or high (Tercile 3) RCHD payments over IPPS categories, and (2) including them as independent variables in a multivariate regression model with the RCHD payments over IPPS as the dependent variable.

Under Topic Area 3 (Impact), a subset of the characteristics shown in Exhibit 3.2, measured at baseline, was used to construct the comparison group (see Appendix E for a list of the matching variables used). Additionally, several of these variables were used as covariates in the DID regressions (the full list of variables used as covariates is given in Section 3.1.2.3).

Exhibit 3.2: Hospital Operational and Contextual Characteristics

Hospital Operational & Contextual Characteristics	Included in Topic Area 1: Attributes	Included in Topic Area 2: Payments	Included in Topic Area 3: Impact — Matching Variable	Included in Topic Area 3: Impact — Covariate
Hospital Operational Characteristics				
Hospital for-profit status (public, non-profit, for-profit)	✓		✓	✓
Hospital system status (independent vs. system)	✓		✓	
Patient Volumes				
Average daily census, acute care beds	✓		✓	✓
Average daily census, swing beds	✓			✓
Number of acute care beds	✓			
Inpatient Discharges				
Number of Medicare discharges	✓		✓	✓
Medicare acute care discharges		✓		
Swing bed discharges		✓		
Number of Medicaid discharges	✓			✓
Number of total discharges	✓		✓	✓
Clinical Complexity & Disproportionate Share				
Hospital case mix index	✓		✓	✓
Disproportionate share status	✓			
Hospital Base or Rebase Characteristics				
Total Medicare inpatient cost in base or rebase year		✓		
Total swing bed cost in base or rebase year		✓		
Medicare acute care discharges in base or rebase year		✓		
Swing bed discharges in base or rebase year		✓		
Hospital Contextual Characteristics				
Market Typology & Market Area Characteristics				
Market Typology (Isolated, Frontier, Competitive)	✓	✓	✓	
Number of hospitals within 35-mile radius	✓			✓
Miles to the nearest acute care hospital	✓			✓
Number of CAHs within 35-mile radius	✓			✓
Local Socioeconomic Factors				
Total population	✓			
Population density	✓			✓

Exhibit 3.2: Hospital Operational and Contextual Characteristics				
Hospital Operational & Contextual Characteristics	Included in Topic Area 1: Attributes	Included in Topic Area 2: Payments	Included in Topic Area 3: Impact	
			Matching Variable	Covariate
Population change				✔
Percentage of residents aged 65 years and over	✔		✔	✔
Percentage of residents with high school education or less	✔		✔	✔
Percentage White Non-Hispanic	✔		✔	✔
Percentage of residents below 150% of poverty line	✔		✔	✔
Percentage of residents who are unemployed	✔		✔	✔
Median household income	✔			✔
Median home value	✔			✔
State Medicaid expansion status	✔		✔	✔

Hospital Operational Characteristics. We constructed variables for hospital characteristics to measure patient volumes, discharges, and patient clinical complexity, as well as additional organizational characteristics that are important determinants of hospital finances. For instance, low patient volumes impact rural hospitals' ability to generate the revenues needed to cover fixed costs, update infrastructure, and invest in new services.[37] Inadequate capacity can compromise rural hospitals' ability to deliver high quality patient care and achieve operational efficiency. Organizational characteristics, such as hospital system membership, can help rural hospitals improve their financial and operational performance. For instance, hospital system membership may offer rural hospitals access to technology that would otherwise be costly to

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[37] Mueller, K. J., Alfero, C., Coburn, A. F., Lundblad, J. P., MacKinney, A. C., McBride, T. D., & Weigel, P. (2017). After hospital closure: Pursuing High Performance Rural Health Systems Without Inpatient Care. RUPRI Health Panel, University of Iowa. http://www.rupri.org/wp-content/uploads/Evaluating-the-Impact-of-Policy-Changes-on-Rural-Populations.pdf

procure and maintain; it may also help with staff recruitment and retention, provide a stable source of referrals, and reduce hospital costs via group purchasing.[38]

Market Typology and Market Area Characteristics. We followed the definition of a hospital's geographic market given in the 2018 *Report to Congress* as the ZIP Codes within a 35-mile radius of a hospital.[39] The CAH and SCH rural payment methodologies also use this radius in their eligibility criteria. As noted in Section 1.4 of this report, the 2018 *Report to Congress* divided hospital markets into three separate groups (or typologies) based on population changes and market competition: Competitive markets have three or more hospitals within 35 miles; Frontier markets have low levels of competition (maximum of two hospitals within 35 miles) and a stable or growing population; and Isolated markets have low levels of competition (maximum of two hospitals within 35 miles) and a declining population.[40] Because of data limitations in getting consistent ZIP Code-level data for all demonstration years, we used county-level data to measure population change.

Local Socioeconomic Factors. We constructed variables to measure county demographics and state policy because these can influence hospitals' patient volumes and finances. State Medicaid expansion can favorably impact rural hospitals because increased Medicaid coverage for previously uninsured patients reduces uncompensated care expenditures, thereby strengthening hospitals' financial positions.[41]

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[38] Oyeka, O., Ullrich, F., MacKinney, A. C., Lupica, J., & Mueller, K. J. (2018). The Rural Hospital and Health System Affiliation Landscape—A Brief Review. RUPRI, University of Iowa. https://rupri.public-health.uiowa.edu/publications/policypapers/Rural%20Hospital%20and%20Health%20System%20Affiliation.pdf

[39] CMS. (2018, October). *Report to Congress: Rural Community Hospital Demonstration,* p. 32. https://innovation.cms.gov/files/reports/rch-rtc.pdf

[40] CMS. (2018, October). *Report to Congress: Rural Community Hospital Demonstration,* p. 32. https://innovation.cms.gov/files/reports/rch-rtc.pdf

[41] Lindrooth, R. C., Perraillon, M. C., Hardy, R. Y., & Tung, G. J. (2018). Understanding the relationship between Medicaid expansions and hospital closures. *Health Affairs, 37*(1), 111–120.

3.1.2 Evaluation Methods

3.1.2.1 Descriptive Analysis of RCHD Participants and Comparison Hospitals

Under Topic Area 1 (Attributes) we used descriptive statistics to analyze the financial outcomes described in Section 3.1.1.1 and the contextual and hospital characteristics described in Section 3.1.1.2.

We compared the outcomes and characteristics of RCHD hospitals to eligible non-participant hospitals prior to when they joined the RCHD (at baseline) and during the demonstration period. For hospitals belonging to the MMA cohort, the baseline years were FY 2002–2004, and the demonstration period was FY 2005–2017. For hospitals belonging to the ACA cohort, the baseline years were FY 2008–2010, and the demonstration period was FY 2011–2017. Baseline and demonstration period means in each case are simple averages of the year-specific means. We also report overall results for both cohorts combined. In this case, the baseline period pools hospital-year observations for FY 2002–2004 and FY 2008–2010, with MMA cohort hospitals contributing observations for FY 2002–2004 and ACA cohort hospitals contributing observations for FY 2008–2010. Demonstration period means, for both cohorts combined, are derived similarly.

To present attributes of RCHD hospitals, Topic Area 1 (Attributes) presents frequencies for binary variables and means and standard deviations for continuous variables. Distributions (10th percentile, median, and 90th percentile) are also discussed for key variables and groupings. To compare participants with non-participants, we use bivariate t-tests to assess statistical similarity. Finally, we present outcome trends for RCHD and eligible non-participant hospitals across baseline and demonstration periods.

Unlike Topic Area 3 (Impact), which uses an entropy-balanced comparison group as a benchmark, Topic Area 1 (Attributes) uses as a benchmark all eligible non-participants. Two different reference groups are used in each topic area to tailor the analysis to meet the objectives of that area. The objective of Topic Area 1 (Attributes) is to compare RCHD participants to a broad and representative group of non-participants that also meet RCHD eligibility criteria but do not participate in the demonstration. Causal analysis under Topic Area 3 (Impact) requires a comparison group that is a subset of all eligible non-participants that have similar baseline financial outcome trends to participants.

3.1.2.2 RCHD Payment Analysis

Under Topic Area 2 (Payments) we compare the payments participant hospitals received under the RCHD for inpatient acute care and swing bed services against the amount hospitals would have been paid under IPPS (plus SNF PPS) in the absence of participation. IPPS payments are calculated by the MACs and reported in the settled cost reports. The IPPS payments are inclusive of any additional payments that would have been made to hospitals such as SCH, MDH, or low-volume adjustment payments.

Section 5 studies the relationship between additional RCHD payments over IPPS and cost per discharge at base or rebase year, Medicare discharges for inpatient acute care and swing beds, and market type characteristics. First, we created three terciles of RCHD payments over IPPS: Tercile 1 includes hospital year observations with RCHD payments over IPPS in the minimum to the 33rd percentile of the distribution, Tercile 2 includes hospital year observations in the 34th to 66th percentiles of the distribution, and Tercile 3 encompasses hospital year observations in the 67th to 100th percentiles of the distribution. We stratified the characteristics by the three terciles.

Second, we employed multivariate regression analyses with the additional RCHD payment over IPPS as the dependent variable and RCHD payment components (hospital base year cost per discharge, Medicare inpatient acute care and swing bed volume) and market type as the independent variables. We estimated the following equation:

$$RCHD_{Diff_{h,t}} = \alpha + \alpha_1 Medicare\ cost\ per\ discharge_{h,base\ or\ rebase\ yr} + b_1 Inpatient\ discharges_{h,t}$$
$$+ b_2\ Swing\ bed\ discharges_{h,t} + \gamma_1 Market\ type_{h,t} + \phi(Year)$$
$$+ \varepsilon_{h,t} \hspace{3cm} (\boldsymbol{Equation\ 1})$$

Where:

- $RCHD_{Diff_{h,t}}$ is the additional RCHD payments for acute care and swing bed services over IPPS plus SNF PPS for RCHD hospital h in year t ($t = 2005,\dots 2017$);

- $Medicare\ cost\ per\ discharge_{h,base\ or\ rebase\ yr}$ is

  $$\frac{(Acute\ care\ cost + Swing\ bed\ cost)_{base\ or\ rebase\ year_h}}{(Acute\ care\ discharges + Swing\ bed\ discharges)_{base\ or\ rebase\ year_h}}\ in\ hospital\ h$$

  in base or rebase year;

- Acute care discharges are total Medicare acute care discharges in hospital h in

- year t;
- Swing bed discharges are total Medicare swing bed discharges in hospital *h* in year t;
- ϕ estimates year fixed effects to account for contemporaneous changes in the rural health and rural health care that affect all participant hospitals similarly;
- α is the regression constant; and
- $\varepsilon_{h,t}$ is a mean zero error term.

The regression model is estimated in a panel dataset (repeated cross-sections) where an RCHD hospital is present in the data over multiple fiscal years. Therefore, there are concerns that serial correlation may lead to invalid standard errors. We estimated cluster robust standard errors at the hospital level to allow error terms to be correlated within clusters, but independent across clusters.[42]

Third, we tested for nonlinearities in the association between the additional RCHD payments and the RCHD payment components; namely, base or rebase year cost per discharge, Medicare inpatient acute care volume, and swing bed volume. Results appear in Appendix E.

In particular, we created categorical variables to capture specific ranges in base or rebase year costs per discharge, as well as in Medicare inpatient acute care and swing bed volumes. We then checked if hospitals in higher cost per discharge or volume ranges were associated with larger additional RCHD payments over IPPS compared to hospitals in the lowest cost per discharge or volume range. To create the categorical variables, instead of using arbitrary range cutoffs, we used a data-driven approach where the distribution for the three independent variables was used to divide the range of the data into five categories (quintiles)—each quintile representing 20 percent of the range. The first quintile references observations where the values of the variable of interest (i.e., base or rebase year cost per discharge, Medicare inpatient acute care volume, swing bed volume) is at the bottom 20 percent of the distribution, the second quintile captures the values of the variable of interest that fall between 20 and 40 percent of the distribution, etc.

Finally, we identified trends and variation in additional RCHD payments above IPPS and additional RCHD swing bed payments over SNF PPS from FY 2005 to FY 2017. Tables of trends and variation included additional RCHD payments over IPPS and additional swing bed

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[42] Cameron, A. C., & Miller, D. L. (2015). *A practitioner's guide to cluster-robust inference.* http://cameron.econ.ucdavis.edu/research/Cameron_Miller_JHR_2015_February.pdf

payments over SNF PPS in the 25th percentile, 50th percentile, and 75th percentile for all participating hospitals in each fiscal year from 2005 to 2017. We also presented the total and per capita additional RCHD payments over IPPS, the percentage increase in RCHD payments relative to IPPS per capita, the per discharge RCHD payments over the IPPS, and the RCHD swing bed payment[43] share of RCHD additional payments over IPPS.

3.1.2.3 Pre-Post Association of RCHD Hospital Outcomes with the RCHD

For Topic Area 3 (Impact) we used a multivariate regression approach to compare the financial condition of participant hospitals to their condition before joining the RCHD. We aimed through this analysis to directly assess how outcomes changed before and after hospitals participated in the demonstration. We estimated the regression described by equation (2) for hospitals that participated in the RCHD. We assigned hospital-specific baseline and demonstration periods for each RCHD hospital, based on its cohort of entry (MMA or ACA) into the RCHD. Following the approach used in the 2018 *Report to Congress,* the baseline period covers the three-year period prior to the start of the cohort. The demonstration period starts in the first year of the demonstration cohort to which the hospital belongs. Exhibit 1.7 shows the different times at which hospitals entered the RCHD and their length of participation. The model is specified as follows:

$$Y_{ht} = \alpha_h + \gamma_{post} Post_{ht} + X_{ht} + \varepsilon_{ht} \qquad\qquad (\textbf{\textit{Equation 2}})$$

Where:
- Y_{ht} is the outcome of interest for hospital h in year t.
- α_h are hospital fixed effects.
- $Post_{ht}$ is the demonstration period dummy variable. In a given year, $Post_{ht} = 1$ if a participant hospital is part of the RCHD in that year, and $Post_{ht} = 0$ if it is not.
- γ_{post} is the coefficient of interest that measures the pre-post impact of the RCHD on participants. It measures the average change in an outcome in the demonstration period compared with the baseline period.
- X_{ht} represents time-varying hospital and market characteristics for hospital *h* in year t.[44]

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[43] This amount includes RCHD swing bed payment over SNF PPS.

[44] X_{ht} contains the following covariates: average daily census of swing beds, Medicare discharges, Medicaid discharges, total discharges, number of acute care beds, DSH indicator, number of hospitals within 35 miles, miles to nearest hospital, number of CAHs within 35 miles, county population density, median household income, median home value, percentage of the population with high school education only, indicator for whether the state has expanded Medicaid in or prior to that year, poverty rate, percentage of county

- ε_{ht} is the error term.

We clustered standard errors at the hospital level to account for the fact that we have multiple observations for the same hospital over time. A limitation of this approach is that the coefficient γ_{post} does not necessarily have a causal interpretation. The reason is that this model does not use a comparison group and therefore cannot simulate what the participant outcomes would have been in the absence of the RCHD, as these are not observed after a participant has entered the RCHD. To address these issues, we also estimated the DID specification, described in the next section, incorporating the comparison group to measure model impacts.

3.1.2.4 Difference-in-Differences Analysis

We examined the impact of the RCHD on the financial condition of hospitals by using a quasi-experimental impact evaluation methodology that employs a two-step approach. In the first step, we constructed a comparison group of hospitals with characteristics similar to those of the participant hospitals. In the second step, we compared the financial outcomes of participant hospitals to those of the comparison group using a staggered DID approach, which allowed us to account for the fact that participant hospitals joined the RCHD at different times. Baseline and post-demonstration periods are defined the same way as for the pre-post model described in Section 3.1.2.3.

Identifying assumption. The identifying assumption of the DID model is that the outcome trend of the comparison group would have been parallel to the outcome trend of the RCHD group if the demonstration had not occurred. This assumption is not directly testable, but we discuss below the tests we conducted to show that the assumption is likely satisfied. A comparison group constructed by improving balance between the RCHD and comparison groups is more likely to satisfy the identifying assumption required to obtain valid DID estimates. We now describe the construction of these comparison groups.

Selection criteria applied to RCHD and non-participant hospitals. For Topic Area 3 (Impact), we applied three criteria that altered the number of hospitals and hospital-year observations for both RCHD and non-participant hospitals. Before applying any criteria, there

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population over 65 years old, unemployment rate, indicator for hospital is a non-profit, indicator for hospital is government-run, indicator for hospital is in a system, average daily census of acute care beds, hospital case mix index, number of Medicare discharges, total number of discharges, and percentage White in county.

were 33 RCHD hospitals and 2,094 non-participant hospitals in rural areas. The following are the criteria we applied, and the number of hospitals reduced by each criterion, where the numbers removed are sequential from each step and the percentages are relative to the sample sizes before any criteria are applied (the Step 3 sample sizes are for the combined MMA and ACA cohort sample):

1. Excluded RCHD and comparison hospitals that transitioned to being a CAH in FY 2006 or earlier[45]

   o RCHD hospitals removed: 3 (9.1 percent)

   o Non-participant hospitals removed: 727 (34.7 percent)

2. Removed all hospital-year observations where a hospital was a CAH

   o RCHD hospitals removed: 0

   o Non-participant hospitals removed: 541 (25.8 percent)[46]

3. Applied eligibility criteria to non-participant hospitals (rural, not a CAH, fewer than 51 beds, had emergency department services)

   o RCHD hospitals removed: 0

   o Non-participant hospitals removed: 228 (10.9 percent)

4. Removed all hospitals that were missing all baseline data for a matching covariate

   o RCHD hospitals removed: 1 (3.0 percent)

   o Non-participant hospitals removed: 87 (4.2 percent)

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[45] In 2005, there was a policy change that waived the distance requirement to be a CAH, allowing many small rural hospitals to become CAHs. As a result of this policy change, 9 percent of MMA RCHD hospitals (3 hospitals) became CAHs in FY 2000–2006, whereas about 35 percent of comparison hospitals became CAHs in FY 2000–2006. If the policy change affected the groups equally, this would be captured by the DID model and would not present a potential source of bias. However, this large difference across RCHD and comparison hospitals suggests there was a large compositional change that was asymmetric across groups that could bias the results. In particular, the composition of hospitals changed more between the baseline and post-demonstration period for the comparison group than for the RCHD group. If the hospitals that became CAHs had different outcome trends than the hospitals that did not become CAHs, this would lead to biased treatment effects from the DID model.

[46] These hospitals were removed because they were CAHs for every FY for which they had data in our sample.

After applying the criteria, there were 29 RCHD hospitals and 511 comparison hospitals in the combined MMA and ACA sample.

Selection of the comparison groups. Our primary focus was on the combined MMA and ACA cohort sample. In addition, we estimated impacts of the RCHD for five different subgroups, as detailed below. We created one comparison group for the combined MMA and ACA cohort sample, as well as one for each of the five subgroup analyses, for a total of six comparison groups. The following are the steps used to construct the comparison group for the combined MMA and ACA sample:[47]

1. We divided RCHD hospitals by cohort of entry (i.e., MMA cohort and ACA cohort).

2. We defined a baseline period for each cohort. For the MMA cohort, the baseline period is FY 2002–2004. For the ACA cohort the baseline period is FY 2009–2011.[48] For the weighting algorithm in Step 3, which uses observed variables in the baseline period, non-participant hospitals were assigned the same baseline period as the RCHD hospitals. For example, if a non-participant hospital had data for FY 2002–2017 and met the eligibility criteria in the baseline periods of both cohorts, it would be matched to the MMA cohort using its baseline characteristics in FY 2002–2004 and to the ACA cohort using their baseline characteristics in FY 2009–2011.

3. We restricted the pool of non-participant hospitals by RCHD cohort to those that were not CAHs, had emergency department services in each year of the baseline period for the given cohort, and had rural status and fewer than 51 beds for any year of the baseline period for the given cohort.

4. We then constructed weighted comparison groups for each cohort by assigning weights to each non-participating hospital using the baseline FYs for that cohort,

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[47] The comparison groups for the subgroups were constructed similarly. The comparison groups for the cohort subgroups applied only steps 2 through 4 for the given cohort. For the market typology subgroup analyses, steps 1 through 5 were applied only for hospitals with the given market typology.

[48] Topic Areas 1 and 3 use the same baseline period for the MMA cohort, but a slightly different period for the ACA cohort. For Topic Area 3, the baseline period for the ACA cohort is FY 2009–2011 because most hospitals in this cohort joined the RCHD toward the end of FY 2011 or in FY 2012.

defined in Step 2. These weights were assigned using an entropy balancing[49] algorithm. This algorithm assigns weights to non-participant hospitals so that the means of the observed variables included in the algorithm are nearly exactly equal (difference of 0.015 for all variables).

5. Finally, we appended the weighted comparison groups.

We used only a subset of baseline outcomes, hospital characteristics, and hospital market area and county-level characteristics in the entropy balancing algorithms for each cohort due to issues achieving convergence of the algorithm that sometimes occurred. The strategy we followed was to include in the algorithm a set of variables that we deemed to be the most important theoretically.[50] If the algorithm converged with all of these variables, then we added additional variables from the full list. The full list of matching variables used for each cohort and subgroup is provided in Appendix G, Exhibit G1.

Comparison group testing. To evaluate the quality of the weighted comparison groups, we conducted two statistical tests and one graphical comparison. First, we evaluated whether the RCHD and comparison hospitals were similar based on observable characteristics by conducting standardized bias tests. For such tests, a 10 percent threshold (in absolute value) is suggested for the standardized difference after adjustment.[51,52] Second, we evaluated, using regression analysis and visually graphing the trends, whether the RCHD and comparison hospitals had parallel outcome trends during the baseline period. To increase the likelihood that the identifying assumption of the DID model would be satisfied, we chose an entropy-weighted

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[49] Hainmueller, J. (2012). Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis, 20*(1), 25–46.

[50] At the first priority level were baseline levels of Medicare inpatient margins and total profit margins. At the second priority level were market area category, poverty rate, percentage White, state Medicaid expansion status, percentage of residents aged 65 years and older, and unemployment rate.

[51] Rosenbaum, P., & Rubin, D. (1985). Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *American Statistician, 39,* 33–38.

[52] The calculation of standardized bias is defined by the formula:

$$\text{Bias} = \frac{\bar{X}_D - \bar{X}_C}{\left(\frac{\left(\sigma_D^2 + \sigma_C^2\right)}{2} \right)^{1/2}}$$

where $\bar{X}_D$ and $\bar{X}_C$ represent the sample means in the matched demonstration and comparison groups, respectively, for a given covariate, and σ_D^2 and σ_C^2 represent the variances in the full demonstration group and the full comparison group, respectively.

comparison group that had baseline outcome trends parallel to the outcome trends of the RCHD group.[53] To assess whether RCHD and comparison groups had parallel baseline trends, thus providing evidence of satisfying the identifying assumption, we estimated a regression model that estimates impacts of the RCHD for each relative year, where a relative year is defined as the number of years from the first year of the cohort of which the participating hospital entered the demonstration. This model is used only to test for parallel baseline trends, not to estimate the impacts of the demonstration.[54] The model used to estimate average impacts of the demonstration is detailed below. The regression model used to test for baseline parallel trends is:

$$Y_{ht} = \alpha_h + \alpha_t + \gamma_1 rel\ year\ minus\ 2 + \gamma_2 rel\ year\ minus\ 1 + \gamma_3 rel\ year\ 1 + \ldots + \gamma_{15} rel\ year\ 13 + X_{ht} + \varepsilon_{ht} \qquad (\boldsymbol{Equation\ 3})$$

Where:

- Y_{ht} is the outcome of interest for hospital h in year t.
- α_t denote fiscal year fixed effects. That is, there is one indicator for each fiscal year.
- α_h are hospital fixed effects. That is, there is one indicator for each hospital. These fixed effects control for all time-invariant (fixed) hospital characteristics.
- $rel\ year\ minus\ 2$ = 1 if an RCHD hospital's cohort started three years after that year, and 0 for all comparison group hospitals in all time periods and all RCHD hospitals in any year that is not three years before the first year of the hospital's cohort.
- $rel\ year\ minus\ 1$ = 1 if an RCHD hospital's cohort started two years after that year, and 0 for all comparison group hospitals in all time periods and all RCHD hospitals in any year that is not two years before the first year of the hospital's cohort.
- $rel\ year\ 0$ = 1 if an RCHD hospital's cohort started one year after that year, and 0 for all comparison group hospitals in all time periods and all RCHD hospitals in any year that is not one year before the first year of the hospital's cohort. This indicator is omitted from the model (due to perfect multicollinearity), so the coefficients on each relative year indicator are interpreted relative to this time period.
- $rel\ year\ 1 \ldots rel\ year\ 13$ = 1 if an RCHD hospital's cohort started 1 . . . 13 years before that year, and 0 for all comparison group hospitals in all time periods and all RCHD hospitals in

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[53] We focused on achieving parallel baseline trends for Medicare inpatient margins and total profit margins.

[54] Borusyak, K., & Jaravel, X. (2017, May 8). *Revisiting event study designs.* https://ssrn.com/abstract=2826228

any year that is not 1 . . . 13 years after the first year of the hospital's cohort.

- γ_1 and γ_2 are the coefficients of interest from this model. They represent the difference in baseline trends between the RCHD and comparison groups.
- X_{ht} represents time-varying hospital and market characteristics for hospital h in year t.[55]
- ε_{ht} is the error term.

To assess parallel baseline trends, we assess whether γ_1 and γ_2 were jointly significantly different from 0, using an F-test. If they are, we interpret this as evidence of parallel baseline trends. The results of this test are reported in Appendix G, Exhibit G4, and the results are discussed in Section 6.9.2.

Assessing RCHD impacts on hospital financial outcomes. We used a staggered DID model to evaluate the impact of the RCHD on the financial condition of participant hospitals. This model is identical to the model used to test for parallel baseline trends except that the relative year indicators are collapsed into a single indicator in order to obtain average effects of the demonstration. The model is specified as follows:

$$Y_{ht} = \alpha_h + \alpha_t + \gamma_{DD} D_{ht} + X_{ht} + \varepsilon_{ht} \qquad (\boldsymbol{Equation\ 4})$$

Where:

- Y_{ht} is the outcome of interest for hospital h in year t
- α_t denote fiscal year fixed effects. That is, there is one indicator for each fiscal year.
- α_h are hospital fixed effects. That is, there is one indicator for each hospital. These fixed effects control for all time-invariant (fixed) hospital characteristics.
- D_{ht} is the treatment dummy variable. In year t, $D_{ht} = 1$ if an RCHD hospital is in the demonstration in that year. $D_{ht} = 0$ for all comparison group hospitals in all time periods and all RCHD hospitals not yet in the demonstration in year t.
- γ_{DD} is the coefficient of interest that measures the impact of the demonstration on RCHD hospitals. It measures the average change in outcome Y in the post-demonstration period compared to the baseline period for RCHD hospitals, after it differences out the same change

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[55] X_{ht} contains the following covariates: average daily census of swing beds, Medicare discharges, Medicaid discharges, total discharges, number of acute care beds, DSH indicator, number of hospitals within 35 miles, miles to nearest hospital, number of CAHs within 35 miles, county population density, median household income, median home value, percentage of the population with high school education only, indicator for whether the state has expanded Medicaid in or prior to that year, poverty rate, percentage of county population over 65 years old, unemployment rate, indicator for hospital is a non-profit, indicator for hospital is government-run, indicator for hospital is in a system, average daily census of acute care beds, hospital case mix index, number of Medicare discharges, total number of discharges, and percentage White in county.

for comparison hospitals. The comparison group hospital trend serves as a counterfactual to measure what would have been the trend of the RCHD hospitals in the absence of the demonstration.

- X_{ht} represents time-varying hospital and market characteristics for hospital *h* in year *t*.[56]
- ε_{ht} is the error term.

Groups of analysis. As mentioned above, our primary sample of interest is the combined sample of RCHD hospitals that participated in either the MMA or ACA cohorts, and their matched comparison hospitals. In addition, we conducted five DID subgroup analyses by cohort (two) and market typology (three) to answer different research questions. As explained above, separate entropy-weighted comparison groups were constructed for each subgroup. The variables used in the entropy balancing algorithms followed the selection strategy described above but did not always include the same variables as the overall model. The sample restrictions described above were also applied to all groups of analysis. Next, we describe the two sets of subgroup analyses in more detail.

Variation in the RCHD's impact by cohort. The motivation for this analysis is discussed in Section 1.4. To estimate cohort-specific effects, we estimated equation (4) separately for two groups of RCHD hospitals: 1) hospitals that were part of the MMA cohort (i.e., hospitals that began their RCHD participation during the MMA-authorized demonstration period, and either continued into the ACA-authorized extension period or not); and 2) hospitals that participated in the ACA extension but not in the MMA-authorized demonstration period. One comparison group was constructed for each cohort. The results for these subgroups are reported in Section 6.6.

Variation in the RCHD's impact by market factors. The motivation for this analysis is discussed in Section 1.4. To estimate the RCHD's impacts by market factors, we classified hospitals based on their market typology (as described in Section 3.1.1.2) and estimated

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[56] X_{ht} contains the following covariates: average daily census of swing beds, Medicare discharges, Medicaid discharges, total discharges, number of acute care beds, DSH indicator, number of hospitals within 35 miles, miles to nearest hospital, number of CAHs within 35 miles, county population density, median household income, median home value, percentage of the population with high school education only, indicator for whether the state has expanded Medicaid in or prior to that year, poverty rate, percentage of county population over 65 years old, unemployment rate, indicator for hospital is a non-profit, indicator for hospital is government-run, indicator for hospital is in a system, average daily census of acute care beds, hospital case mix index, number of Medicare discharges, total number of discharges, and percentage White in county.

equation (4) for each of the three market categories separately.[57] This allowed us to test whether, on average, RCHD outcomes and impacts (listed in Exhibit 3.1) vary across each market area type. One comparison group was constructed for each subgroup. The results for these subgroups are reported in Section 6.7.

Swing bed reimbursement under the RCHD. The accounting framework of the RCHD affords an advantage to hospitals that offer more services in Medicare swing beds as opposed to Medicare acute care beds. The reason for this is explained in Section 1.1.2 and Appendix A. Due to this benefit to RCHD hospitals' Medicare inpatient margins of substituting Medicare acute care beds for Medicare swing beds, our hypothesis is that hospitals would increase their share of Medicare revenue coming from swing beds to improve their financial position resulting from RCHD payments.

We investigated whether hospitals responded to the RCHD by shifting costs to types of care with greater reimbursement potential under the RCHD—that is, whether they received a greater portion of Medicare revenue from swing beds.

We performed two types of analysis:

(a) A bivariate t-test comparing the difference in means of the share of revenue from swing beds between the RCHD and comparison hospitals at baseline and during the demonstration period.

(b) A DID analysis with share of revenue from swing beds as the outcome, obtained as a result of estimating equation (4).

The results for this analysis are reported in Section 4, throughout Section 6, and summarized in Section 6.8.

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[57] We adapted the definition used in the 2018 *Report to Congress* to the current evaluation period by using county-level (instead of ZIP-Code-level) population growth and using five-year windows prior to the beginning of each RCHD cohort (instead of a single 10-year window that encompassed the RCHD period) to measure population growth. More specifically, we define Competitive markets as those that have three or more hospitals within 35 miles; Frontier markets as those that have low levels of competition (a maximum of two hospitals within 35 miles) and a stable or growing county-level population over a five-year period; and Isolated markets as those that have low levels of competition and declining county-level population growth over a five-year period. The majority of RCHD markets have the same typology regardless of whether the earlier definition or this updated definition is used.

Randomization inference. In addition to performing inference using traditional parametric methods, we also conducted statistical inference for the DID coefficient estimates using randomization inference. Randomization inference may be more appropriate than parametric inference in cases with small sample sizes. With fewer than 20 RCHD hospitals in each cohort, that challenge was present in this evaluation.

A small sample size does not bias the coefficient estimates obtained when the DID specification described in equation (4) is estimated. However, a small sample size implies that inference based on parametric standard errors is unreliable because it depends on asymptotic approximations.[58]

We therefore used randomization inference as a robustness check to address this concern. Randomization inference, also known as permutation-based inference, is a non-parametric technique for calculating *p*-values. To implement this technique, we randomly assigned placebo demonstration treatment status to different sets of comparison hospitals. The randomization inference *p*-values represent the proportion of times the placebo treatment effect is larger than the actual estimated treatment effect for RCHD hospitals. A *p*-value smaller than a predetermined threshold (e.g., the 10 percent level) suggests that the RCHD had an impact, whereas the frequent occurrence of large placebo effects compared to estimated treatment effects (i.e., large *p*-values) would suggest that the demonstration had no statistically significant impact.

In Section 6 we show the results of estimating equation (4) and two sets of *p*-values: parametric (or traditional) *p*-values and non-parametric *p*-values based on randomization inference. In our experience and the existing literature, when sample sizes are large enough, traditional *p*-values

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[58] Bloom, N., Eifert, B., Mahajan, A., McKenzie, D., & Roberts, J. (2013). Does management matter? Evidence from India. *Quarterly Journal of Economics, 128*(1), 1–51.

and randomization inference *p*-values are almost identical.[59,60,61] However, in cases with smaller sample sizes, randomization inference *p*-values are more appropriate.[62]

In this report, we use the following rules regarding the reporting and interpretation of traditional and randomization inference *p*-values:

- We report both traditional and randomization inference *p*-values for all regression results in the results tables.

- For the purposes of defining whether there is an impact of the RCHD on an outcome, we consider the randomization inference *p*-value to take precedence over the traditional *p*-value if they are inconsistent.

    o The exception to this rule is if the traditional and randomization inference *p*-values are very similar and very close to the 10 percent significant threshold, we consider this result to be statistically significant.

- When discussing the results, we note all cases where there are inconsistencies between traditional and randomization inference *p*-values.

3.2 Qualitative Methodology

The research team conducted interviews with members of hospital leadership to gain a better understanding of hospital services and the environment in which hospitals operate, including market characteristics. Interviews also gathered the perspective of leadership on factors that influence hospital financial viability, reasons to participate in the RCHD, and the use of demonstration funds. Given the changing market conditions hospitals face and the strategies

[59] Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2018). Effects of the Affordable Care Act on health care access and self-assessed health after 3 years. *Inquiry: A Journal of Medical Care Organization, Provision and Financing*, *55*, 46958018796361.

[60] Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2017). Early impacts of the Affordable Care Act on health insurance coverage in Medicaid expansion and non-expansion states. *Journal of Policy Analysis and Management, 36*(1), 178–210.

[61] Courtemanche, C., & Zapata, D. (2014). Does universal coverage improve health? The Massachusetts experience. *Journal of Policy Analysis and Management, 33*, 36–69.

[62] Bloom, N., Eifert, B., Mahajan, A., McKenzie, D., & Roberts, J. (2013). Does management matter? Evidence from India. *Quarterly Journal of Economics, 128*(1), 1–51

they implement in response, these qualitative interviews provided nuanced and up-to-date information that helped contextualize and supplement quantitative data.

Two members of the qualitative analysis team conducted the interviews and received permission from interviewees to record interviews for transcription purposes and subsequent analyses. The senior researcher who conducted the interviews then coded the interview transcripts using NVivo software, with high-level codes aligned with the key research questions. The interviews were coded on a rolling basis as they were completed. To ensure coding consistency, the researchers each coded several transcripts and discussed complex passages to create coding rules. To identify common themes for analysis, we used NVivo to group the data by code.

4 TOPIC AREA 1: ATRIBUTES OF PARTICIPANT HOSPITALS COMPARED TO ELIGIBLE NON-PARTICIPANT HOSPITALS

In this section we present descriptive comparisons of the characteristics of hospitals that participated in the RCHD and demonstration-eligible non-participant hospitals. We also analyze reasons for leaving the demonstration for hospitals that exited.

Section 4.1 presents the key findings of the chapter. In **Section 4.2**, we highlight characteristics of RCHD participants that joined under the MMA authorization period (MMA cohort hospitals) versus hospitals that joined under the ACA authorization period (ACA cohort hospitals). We also compare hospitals that participated in the demonstration for only one authorization period (or round) against hospitals that participated in more than one authorization period. We also examine distributions of some key financial outcomes and hospital characteristics, which are important for contextualizing the correlates of payments received under the demonstration, that are discussed in Section 5 (Topic Area 2: Payments Distributed).

In **Section 4.3**, we present descriptive comparisons of financial outcomes for RCHD participants relative to non-participants, prior to, and during, the demonstration. Comparing participants with non-participants prior to the start of the demonstration (i.e., at baseline) illustrates the baseline financial conditions prompting hospitals to participate in the demonstration. We present operational contextual characteristics of hospitals that joined the demonstration against eligible non-participant hospitals. This analysis helps inform relevant variables for the matching algorithm, implemented in Section 6 (Topic Area 3: Impact of RCHD Payments on Hospital Finances), to construct a comparison group of similar non-participants.

Comparing the financial condition of participants with non-participants during the demonstration period, and changes relative to baseline, illustrates how demonstration participation is associated with changes in hospitals' financial outcomes. We also discuss how operational and contextual characteristics for participants and non-participants change during the demonstration period, relative to baseline, which helps inform covariates that are important to control for in the DID analysis in Section 6 (Topic Area 3 (Impact)).

Lastly, in **Section 4.4**, we examine reasons hospitals either discontinued participation at the end of an authorization period, withdrew prematurely, or closed.

4.1 Key Findings

- **RCHD hospitals appeared to be in stronger financial condition than eligible non-participants prior to the demonstration.** The demonstration attracted hospitals that, prior to the start of the demonstration, had higher total profit margins but substantially lower, and negative, Medicare margins as compared to eligible non-participant hospitals. Participating hospitals also had more days of cash on hand, lower debt, and higher staffing efficiency vis-à-vis eligible non-participants.

- **RCHD hospitals were largely non-profits with higher patient volumes in somewhat higher income areas.** At baseline, participating hospitals were more likely to be non-profits, have higher inpatient discharges, and treat more clinically complex patients compared to non-participants. Participant hospitals were also more likely to be located in states that expanded Medicaid, and in less densely populated, but less poor and more educated, counties compared to non-participants. RCHD hospitals were also less likely to be in Competitive markets.

- **At baseline, MMA Cohort hospitals were on average in stronger financial condition than ACA cohort hospitals.** Before joining the RCHD, MMA cohort hospitals had higher Medicare inpatient margins, Medicare combined margins, operating margins, and slightly higher total profit margins than hospitals in the ACA cohort. In addition, MMA cohort hospitals had a few more days cash on hand (DCOH) and a substantially lower age of assets than hospitals in the ACA cohort. Finally, MMA cohort hospitals were less likely to be in Competitive markets and were more likely to be part of a health system and be non-profit compared to the ACA cohort hospitals.

- **Descriptive changes over time suggest the RCHD was associated with higher liquidity, Medicare margins, and swing bed revenue relative to baseline.** Demonstration participation was associated with substantial improvements in participants' Medicare inpatient and Medicare combined margins but not in their total profit margins. Total profit margins include revenues and costs from all payers, as well as investment income, which may explain why improved Medicare margins do not translate to improvements in total profit margins. Participation in the demonstration was also correlated with improvements in hospitals' DCOH, debt, and a reduction in the age of assets. Relative to baseline, the share of Medicare revenue from swing beds increased substantially for participants, while during the same timeframe this share decreased slightly for non-participants.

- **The RCHD was associated with improvements in Medicare margins for both participant cohorts, though improvements in other measures was less consistent.** Both cohorts saw comparable improvements in Medicare inpatient and combined margins during the demonstration period; however, improvements in other measures (such as total profit margins and DCOH) were not observed consistently across MMA vs. ACA cohorts.

- **RCHD participation reflects hospitals' consideration of expected Medicare payments among eligible rural payment programs. Most exiting hospitals switched to CAH or SCH**. Between FY 2005 and FY 2017, 16 hospitals exited from the RCHD. Of these, two hospitals closed, eight withdrew prematurely, and six chose not to continue when the demonstration was reauthorized.

4.2 Attributes of RCHD Participants

This section describes the profile of RCHD participants along two main stratifications of interest: by cohort of entry into the demonstration and for single vs. multi-round participants. We also examine distributions of some key financial outcomes and hospital operational characteristics. The distribution of variables, such as inpatient discharges, that directly affect payments under the RCHD are important for understanding what factors are associated with higher demonstration payments among participants. We further quantify and discuss these factors in Section 5 (Topic Area 2: Payments Distributed).

Profile by cohort of entry. Appendix Exhibit D1 presents the full list of attributes of RCHD hospitals, tabulated by cohort: MMA vs. ACA. During the demonstration period, both cohorts of hospitals had negative Medicare inpatient and combined margins and positive but low total profit margins. For both cohorts of hospitals, the Medicare share of inpatient revenue was in the range of 41–46 percent.

A majority of RCHD participants were non-profit (76 percent MMA vs. 54 percent ACA) and part of a health system (77 percent MMA cohort vs. 57 percent ACA cohort), though the incidence of both these characteristics was much higher among MMA cohort hospitals. Hospitals belonging to both cohorts averaged around 40–41 beds, which is consistent with the eligibility criteria of having more than 25 beds, but fewer than 51. MMA cohort hospitals had, on average, higher patient volumes, as evidenced by indicators such as average daily census for acute care beds

(16 patients per day for MMA vs.12 patients per day for ACA) and total annual discharges (1,716 discharges for MMA vs. 1,313 discharges for ACA). ACA hospitals served slightly more clinically complex patients, while MMA cohort hospitals were more frequently categorized as disproportionate share hospitals (DSH) than ACA cohort hospitals (58 percent MMA cohort vs. 34% ACA cohort).

MMA cohort hospitals were located in less competitive markets, with fewer hospitals in their market area and farther away from the nearest acute care hospitals than ACA cohort hospitals. Seventy-five percent of ACA hospitals were in market areas classified as Competitive whereas only 34 percent of MMA hospitals were in Competitive markets. This difference likely reflects the fact that the demonstration enrolled hospitals from the 10 least densely populated states in the MMA authorization period, whereas it enrolled hospitals from the 20 least densely populated states during the ACA authorization period. While both cohorts of hospitals were in low-income areas with a similar demographic profile, counties of MMA cohort hospitals tended to have slightly higher household incomes (median household income of around $58,000 for MMA cohort counties vs. around $49,000 for ACA cohort counties).

Distributions of hospital outcomes by cohort of entry. Appendix Exhibit D2 presents distributions of key hospital-level variables by cohort of entry into the demonstration. Half of the ACA cohort hospitals had total profit margins less than 0.35%, whereas MMA cohort hospitals had much higher median total profit margins (4.57%). The median DCOH for MMA cohort hospitals is also more than twice as that of ACA cohort hospitals. On the other hand, MMA cohort hospitals are less efficient than ACA cohort hospitals, as measured by FTEs per occupied bed (MMA median 8.65 vs ACA median 6.78). It is also interesting that MMA hospitals are predominantly located in Frontier markets that have less competition and growing populations (Appendix Exhibit D1). These patterns are consistent with a link identified in the literature of strong market power inducing higher private payer revenues that appear to put less pressure on hospitals to constrain costs.[63]

Overall, financial outcomes of hospitals from both cohorts had wide distributions. For instance, for MMA cohort hospitals' DCOH, the 10th percentile of the indicator was three days, and the 90th percentile was 519 days. RCHD hospitals also varied widely in the volume of patients that they served; the 10th and 90th percentiles of annual Medicare inpatient discharges were 143

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[63] Stensland, J., Gaumer, Z. R., & Miller, M. E. (2010). Private-payer profits can induce negative Medicare margins. *Health Affairs, 29*(5), 1045–1051.

and 1,049 for MMA hospitals and 389 and 1,020 for ACA hospitals. The share of Medicare revenues from swing beds for both cohorts was 0 percent at the 10th percentile and was in the 41–49 percent range at the 90th percentile.

Profile of single vs. multi-round participants. Appendix Exhibit D3 presents the attributes of RCHD hospitals for "single-round" participants (participants who were either in the MMA authorization period only or in the ACA authorization period only) vs. "multi-round" participants (hospitals that participate in more than one authorization period). Out of the 33 participant hospitals analyzed in this report, 12 are single-round participants and 21 are multi-round hospitals.

Both sets of hospitals had similar financial margins, but single-round hospitals had poorer liquidity (71 DCOH for single-round participants vs. 136 DCOH for multi-round participants). Single-round hospitals derived a substantially lower share of Medicare revenue from swing beds (6.76 percent for single-round participants vs. 14.60 percent for multi-round participants).

Single-round hospitals overwhelmingly belonged to hospital systems (93 percent single-round vs. 60 percent multi-round) and were non-profits (98 percent single-round vs. 56 percent multi-round). Single-round hospitals were also much more likely to be DSH (78 percent for single-round vs. 38 percent for multi-round). Single-round hospitals tended to have higher volume (as evidenced by higher average daily census for acute care beds and higher discharges) and were somewhat less likely to be in market areas classified as Competitive.

Hospitals classified as single-round were in counties with lower population density that were, on average, lower income than counties in which multi-round hospitals were located.

Distributions of hospital outcomes for single vs. multi-round participants. The distributions of key characteristics for single vs. multi-round participants appear in Appendix Exhibit D4. Both sets of hospitals varied widely when it came to financial outcomes and indicators of patient volumes and clinical complexity. Multi-round hospitals tended to have a wider spread of discharges and Medicare swing bed revenue shares.

4.3 How Participants Compare to Eligible Non-Participants

This section presents descriptive statistics describing the financial conditions and hospital operational and contextual characteristics of RCHD hospitals relative to eligible non-participant hospitals, at baseline and during demonstration years. Results are presented both by cohort of participation (MMA and ACA) and for both cohorts combined. Section 3.1.2.1 describes the approach we used to process this information. The quantitative findings are supplemented by qualitative findings that often highlight additional nuances.

4.3.1 Hospital Financial Conditions

This section compares the baseline financial conditions of RCHD hospitals relative to eligible non-participants in order to understand what financial conditions prompted hospitals to participate in the demonstration.

In this section, we also compare the financial condition of participants with non-participants during the demonstration period, and changes relative to baseline, to analyze how demonstration participation is associated with changes in hospitals' financial outcomes.

We analyze the first three categories of financial indicators presented in Exhibit 3.1: hospital margins, other financial indicators, and Medicare revenue indicators. Other financial indicators and Medicare revenue indicators are non-margin indicators.

Hospital margins. Exhibit 4.1 compares hospital margins of RCHD hospitals with eligible non-participant hospitals. Appendix Exhibit D5 compares distributions of hospital margins across the two groups. Consistent with findings of the 2018 *Report to Congress,* we find that the demonstration attracted hospitals that were in an overall stronger financial position than non-participants but had substantially lower Medicare margins. This was true for both MMA and ACA cohorts. Stronger overall financial positions are evidenced by higher baseline total profit margins for participants vs. non-participants (4.13 percent vs. -0.10 percent) and higher baseline operating margins (0.73 percent vs. -5.79 percent). On the other hand, baseline Medicare inpatient margins were significantly lower for participants vs. non-participants (-18.62 percent vs.-1.47 percent), as were baseline Medicare combined margins (-18.36 percent for participants vs. -3.80 percent for non-participants).

It makes sense that the RCHD attracts hospitals with low Medicare margins because it reimburses hospitals at cost during base years, and these hospitals have high baseline Medicare costs. These hospitals, however, also have higher total profit margins, which include all payer and investment income than non-participants, and as we discuss later, in Section 4.3.2.2, RCHD participants were also more likely than non-participants to be in less competitive markets. That RCHD participants were more likely than non-participants to have lower baseline Medicare inpatient margins, higher total profit margins, and stronger market positions is consistent with findings in the 2018 *Report to Congress*, which highlighted a link between market power and high total profit margins but lower Medicare margins. Research cited in Chapter 3 of a congressional report[64,65] shows that higher private-payer revenues for hospitals with strong market positions, which make them more profitable overall, can lead to higher per-unit costs. This in turn leads to lower Medicare margins because Medicare revenue does not increase even when costs become higher.

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[64] Stensland, J., Gaumer, Z. R., & Miller, M. E. (2010). Private-payer profits can induce negative Medicare margins. *Health Affairs, 29*(5), 1045–1051.

[65] MedPAC. (2016, March). *Report to the Congress: Medicare payment policy.*

http://www.medpac.gov/docs/default-source/reports/march-2016-report-to-the-congress-medicare-payment-policy.pdf?sfvrsn=0

Exhibit 4.1: Hospital Margins, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N$_h$	N$_{obs}$
Medicare Inpatient Margin							
MMA	Baseline	RCHD	-17.37%	15.09%	-15.77%***	16	48
		Eligible Non-Participants	-1.60%	24.70%		912	2,281
	Demonstration	RCHD	-1.15%	8.09%	1.24%	16	100
		Eligible Non-Participants	-2.40%	27.83%		705	4,972
ACA	Baseline	RCHD	-19.86%	13.41%	-18.64%***	16	48
		Eligible Non-Participants	-1.22%	26.32%		414	1,130
	Demonstration	RCHD	-0.20%	7.78%	4.92%***	16	99
		Eligible Non-Participants	-5.12%	29.37%		502	2,590
MMA & ACA	Baseline	RCHD	-18.62%	14.25%	-17.14%***	32	96
		Eligible Non-Participants	-1.47%	25.24%		1,008	3,411
	Demonstration	RCHD	-0.68%	7.93%	1.72%**	32	199
		Eligible Non-Participants	-2.40%	27.83%		705	4,972
Medicare Combined (Inpatient & Outpatient) Margin							
MMA	Baseline	RCHD	-16.29%	13.20%	-12.57%***	16	48
		Eligible Non-Participants	-3.72%	20.10%		912	2,283
	Demonstration	RCHD	-8.09%	9.99%	-0.89%	16	100
		Eligible Non-Participants	-7.19%	25.27%		706	4,985
ACA	Baseline	RCHD	-20.44%	10.55%	-16.48%***	16	48
		Eligible Non-Participants	-3.96%	23.17%		416	1,135
	Demonstration	RCHD	-14.12%	10.11%	-2.86%**	16	99
		Eligible Non-Participants	-11.26%	26.65%		503	2,598
MMA & ACA	Baseline	RCHD	-18.36%	12.07%	-14.56%***	32	96
		Eligible Non-Participants	-3.80%	21.16%		1,010	3,418
	Demonstration	RCHD	-11.09%	10.47%	-3.90%***	32	199
		Eligible Non-Participants	-7.19%	25.27%		706	4,985
Total Profit Margin							
MMA	Baseline	RCHD	4.43%	8.04%	4.33%***	16	48
		Eligible Non-Participants	0.10%	12.20%		910	2,273
	Demonstration	RCHD	5.09%	7.18%	5.39%***	16	100
		Eligible Non-Participants	-0.30%	15.91%		687	4,875
ACA	Baseline	RCHD	3.83%	10.87%	4.35%**	16	48
		Eligible Non-Participants	-0.52%	15.25%		416	1,126
	Demonstration	RCHD	0.55%	10.76%	1.59%	16	99
		Eligible Non-Participants	-1.04%	17.63%		484	2,502
MMA & ACA	Baseline	RCHD	4.13%	9.52%	4.23%***	32	96
		Eligible Non-Participants	-0.10%	13.29%		1,009	3,399
	Demonstration	RCHD	2.84%	9.39%	3.14%***	32	199
		Eligible Non-Participants	-0.30%	15.91%		687	4,875
Operating Margin							
MMA	Baseline	RCHD	2.51%	8.64%	8.07%***	16	48
		Eligible Non-Participants	-5.56%	18.19%		910	2,273
	Demonstration	RCHD	1.39%	13.95%	8.95%***	16	100
		Eligible Non-Participants	-7.56%	21.82%		687	4,875
ACA	Baseline	RCHD	-1.06%	9.67%	5.21%***	16	48
		Eligible Non-Participants	-6.27%	19.98%		416	1,126
	Demonstration	RCHD	-2.27%	11.73%	7.49%***	16	99
		Eligible Non-Participants	-9.76%	23.89%		484	2,502

Exhibit 4.1: Hospital Margins, RCHD Hospitals Compared to Eligible Non-Participant Hospitals			Mean	SD	Difference	N_h	N_{obs}
MMA & ACA	Baseline	RCHD	0.73%	9.30%	6.52%***	32	96
		Eligible Non-Participants	-5.79%	18.80%		1,009	3,399
	Demonstration	RCHD	-0.43%	12.99%	7.13%***	32	199
		Eligible Non-Participants	-7.56%	21.82%		687	4,875

Notes: The baseline periods are as follows: FY 2002–2004 (MMA), FY 2008–2010 (ACA), and FY 2002–2004 and FY 2008–2010 pooled (MMA and ACA). The demonstration periods are as follows: FY 2005–2017 (MMA), FY 2011–2017 (ACA), and FY 2005–2017 (MMA and ACA). SD denotes standard deviation, N_h denotes number of hospitals, and N_{obs} denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. All financial indicators were calculated from HCRIS data using the technical specifications described in Exhibit 3.1. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data. Due to extreme values, the values for each of the four margins' variables are winsorized such that values below –100 are replaced with –100 and values above 100 are replaced with 100. Winsorization of margins affects less than 0.2% of observations for RCHD participants and around 1.66% of observations for non-participants. Means for aggregate periods are the simple average of year-specific means.

*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

Source: HCRIS, FY 2002–2017.

As Exhibit 4.1 also shows, demonstration participation was associated with substantial improvements in participants' Medicare inpatient and Medicare combined margins. During the demonstration period (FY 2005–2017 for MMA cohort hospitals and FY 2011–2017 for ACA cohort hospitals), overall Medicare inpatient margins of participants increased, on average, by around 18 percentage points for participant hospitals (from -18.62 percent to -0.68 percent), whereas they reduced slightly for non-participants (from -1.47 percent to -2.40 percent). The large increase in Medicare inpatient margins was seen for both cohorts of participants and is consistent with the improvements in Medicare inpatient margins associated with earlier demonstration participation as noted in the 2018 *Report to Congress.*

Participant hospitals of both cohorts also increased their Medicare combined (inpatient and outpatient) margins during the demonstration period, but by a smaller magnitude than Medicare inpatient margins (an increase of 7 percentage points). During the same timeframe, Medicare combined margins of non-participants worsened (a decrease of 3 percentage points).

We find that, for both cohorts combined, total profit margins (which include all payers and investment income) of participants decreased slightly (by 1.3 percentage points) during the demonstration period, relative to baseline. Total profit margins of non-participants also worsened somewhat. The decrease in participant total profit margins was driven by ACA cohort hospitals, whereas for MMA cohort hospitals total profit margins increased by a small magnitude. Operating margins also worsened for participant hospitals during the demonstration period, but operating margins worsened more for non-participants (for both cohorts combined, and for the MMA and ACA cohorts separately).

Other financial outcomes. The overall stronger financial positions of hospitals at baseline are also evidenced by other financial outcomes. Hospitals that participated in the demonstration exhibited stronger liquidity (measured by DCOH), lower debt, and higher staffing efficiency (Exhibit 4.2 and Appendix Exhibit D6). At baseline, when compared to eligible non-participant hospitals, RCHD hospitals had more DCOH (112 days vs. 83 days), lower long-term debt to capitalization ratios (25.10 percent vs. 36.56 percent), and slightly lower ratios of salaries to net patient revenues (44.23 percent vs. 47.35 percent), but slightly higher FTEs per occupied bed (7.26 vs. 6.70). However, RCHD participants tended to have slightly older assets measured by the average age of physical plant.

These results were qualitatively true for hospitals in both MMA and ACA cohorts, though cohort-specific results were often not statistically significant, probably due to smaller sample sizes in each cohort.

Exhibit 4.2: Other Financial Indicators, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_{obs}
Days Cash on Hand							
MMA	Baseline	RCHD	116	115	26	16	48
		Eligible Non-Participants	90	422		912	2,283
	Demonstration	RCHD	152	186	82***	16	100
		Eligible Non-Participants	70	111		706	4,994
ACA	Baseline	RCHD	108	163	39	16	48
		Eligible Non-Participants	68	97		416	1,135
	Demonstration	RCHD	93	113	22*	16	99
		Eligible Non-Participants	71	119		503	2,606
MMA & ACA	Baseline	RCHD	112	140	29*	32	96
		Eligible Non-Participants	83	349		1,010	3,418
	Demonstration	RCHD	123	157	52***	32	199
		Eligible Non-Participants	70	111		706	4,994
Long-Term Debt to Capitalization Ratio							
MMA	Baseline	RCHD	30.04%	25.32%	-6.44%	16	48
		Eligible Non-Participants	36.48%	121.07%		911	2,272
	Demonstration	RCHD	24.90%	21.42%	-12.79%**	16	100
		Eligible Non-Participants	37.69%	381.50%		687	4,872
ACA	Baseline	RCHD	20.16%	15.65%	-16.58%	16	48
		Eligible Non-Participants	36.74%	421.11%		415	1,128
	Demonstration	RCHD	22.05%	30.84%	-4.29%	16	99
		Eligible Non-Participants	26.33%	293.62%		483	2,497
MMA & ACA	Baseline	RCHD	25.10%	21.52%	-11.46%**	32	96
		Eligible Non-Participants	36.56%	261.90%		1,009	3,400
	Demonstration	RCHD	23.48%	26.50%	-14.21%**	32	199
		Eligible Non-Participants	37.69%	381.50%		687	4,872

Exhibit 4.2: Other Financial Indicators, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N$_h$	N$_{obs}$
Ratio of Salaries to Net Patient Revenue							
MMA	Baseline	RCHD	44.14%	6.39%	-4.01%***	16	48
		Eligible Non-Participants	48.15%	41.21%		910	2,273
	Demonstration	RCHD	44.45%	9.18%	-2.06%**	16	100
		Eligible Non-Participants	46.51%	31.93%		686	4,873
ACA	Baseline	RCHD	44.32%	8.58%	-1.41%	16	48
		Eligible Non-Participants	45.72%	31.52%		416	1,126
	Demonstration	RCHD	42.29%	8.62%	-4.51%***	16	99
		Eligible Non-Participants	46.81%	25.32%		483	2,500
MMA & ACA	Baseline	RCHD	44.23%	7.53%	-3.12%***	32	96
		Eligible Non-Participants	47.35%	38.29%		1,009	3,399
	Demonstration	RCHD	43.38%	8.95%	-3.13%***	32	199
		Eligible Non-Participants	46.51%	31.93%		686	4,873
FTEs per Occupied Bed							
MMA	Baseline	RCHD	7.48	2.02	0.66**	16	48
		Eligible Non-Participants	6.83	5.60		911	2,274
	Demonstration	RCHD	9.32	5.33	2.64***	16	100
		Eligible Non-Participants	6.68	5.11		684	4,847
ACA	Baseline	RCHD	7.04	2.24	0.58	16	47
		Eligible Non-Participants	6.46	4.69		414	1,124
	Demonstration	RCHD	6.87	2.38	-0.05	16	99
		Eligible Non-Participants	6.92	5.23		480	2,478
MMA & ACA	Baseline	RCHD	7.26	2.13	0.56**	32	95
		Eligible Non-Participants	6.70	5.32		1,007	3,398
	Demonstration	RCHD	8.10	4.30	1.42***	32	199
		Eligible Non-Participants	6.68	5.11		684	4,847
Average Age of Physical Plant							
MMA	Baseline	RCHD	12	14	-1	16	48
		Eligible Non-Participants	14	15		798	1,839
	Demonstration	RCHD	11	8	0	16	100
		Eligible Non-Participants	11	11		648	4,449
ACA	Baseline	RCHD	21	19	11***	14	42
		Eligible Non-Participants	10	10		387	1,035
	Demonstration	RCHD	13	12	2	16	94
		Eligible Non-Participants	12	11		462	2,324
MMA & ACA	Baseline	RCHD	16	17	4**	30	90
		Eligible Non-Participants	12	14		915	2,874
	Demonstration	RCHD	12	10	1*	32	194
		Eligible Non-Participants	11	11		648	4,449

Notes: The baseline periods are as follows: FY 2002–2004 (MMA), FY 2008–2010 (ACA), and FY 2002–2004 and FY 2008–2010 pooled (MMA and ACA). The demonstration periods are as follows: FY 2005–2017 (MMA), FY 2011–2017 (ACA), and FY 2005–2017 (MMA and ACA). SD denotes standard deviation, N$_h$ denotes number of hospitals, and N$_{obs}$ denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. All financial indicators were calculated from HCRIS data using the technical specifications described in Exhibit 3.1. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data. Due to extreme values, we winsorized the following variables: (a) ratio of salaries to net patient revenue at the 1st and 99th percentile, which affected 1.8% of observations for participants and 2.09% of observations for non-participants; (b) FTEs per occupied bed at the 99th percentile, which affected 0.4% of observations for participants and 1% of observations for non-participants; and (c) average age of physical plant values at 60 years, which affected

Exhibit 4.2 also shows that the demonstration appears to have helped participants improve their liquidity, debt, and age of assets, relative to non-participants. However, improvements in these metrics were not consistent across cohorts. For instance, MMA cohort hospitals substantially improved their DCOH (by 35 days), whereas ACA cohort hospitals saw a decline in their DCOH (by 15 days). MMA cohort hospitals had lower long-term debt to capitalization ratios during the demonstration period relative to baseline (lower by 5.14 percentage points), whereas ACA cohort hospitals had higher ratios (higher by 1.89 percentage points).

Both cohorts of hospitals saw an improvement in their average age of physical plant—on average, by 4 years between the baseline and demonstration periods. The distributions in Appendix Exhibit D6 show that improvements in average age of physical plant were driven by hospitals with very old assets upgrading their capital (reduction in the 90th percentile of this measure from 48 years to 23 years among participants).

During the demonstration period, the ratio of salaries to net patient revenue remained roughly the same as during baseline, whereas FTEs per occupied bed somewhat increased.

***Medicare revenue indicators**.* As shown in Exhibit 4.3 and Appendix Exhibit D7, at baseline, RCHD participants had relatively similar Medicare revenue indicators to non-participants. They had a slightly lower share of Medicare inpatient discharges as a fraction of total discharges (46.61 percent vs. 50.92 percent), though this was only true for hospitals belonging to the MMA cohort; a similar share of Medicare inpatient days; and only slightly higher baseline Medicare swing bed revenue shares (5.28 percent vs. 3.92 percent).

Exhibit 4.3: Medicare-Revenue Financial Indicators, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_{obs}
Medicare Share of Inpatient Discharges							
MMA	Baseline	RCHD	46.80%	13.26%	-6.29%***	16	48
		Eligible Non-Participants	53.09%	14.12%		912	2,282
	Demonstration	RCHD	40.77%	9.52%	-5.74%***	16	100
		Eligible Non-Participants	46.24%	14.21%		705	4,983
ACA	Baseline	RCHD	46.42%	10.06%	-0.13%	16	48
		Eligible Non-Participants	46.55%	13.69%		415	1,132
	Demonstration	RCHD	46.26%	9.28%	2.02%**	16	99
		Eligible Non-Participants	44.24%	14.13%		502	2,598
MMA & ACA	Baseline	RCHD	46.61%	11.71%	-4.31%***	32	96

Exhibit 4.3: Medicare-Revenue Financial Indicators, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_{obs}
		Eligible Non-Participants	50.92%	14.31%		1,009	3,414
	Demonstration	RCHD	43.50%	9.77%	-2.74%***	32	199
		Eligible Non-Participants	46.24%	14.21%		705	4,983
Medicare Share of Inpatient Days							
MMA	Baseline	RCHD	62.58%	13.97%	-1.88%	16	48
		Eligible Non-Participants	64.46%	14.26%		912	2,283
	Demonstration	RCHD	55.56%	12.17%	0.02%	16	100
		Eligible Non-Participants	55.53%	15.25%		705	4,983
ACA	Baseline	RCHD	59.86%	11.24%	3.58%**	16	48
		Eligible Non-Participants	56.28%	14.71%		415	1,132
	Demonstration	RCHD	59.06%	10.91%	6.29%***	16	99
		Eligible Non-Participants	52.78%	15.20%		502	2,598
MMA & ACA	Baseline	RCHD	61.22%	12.69%	-0.52%	32	96
		Eligible Non-Participants	61.75%	14.92%		1,009	3,415
	Demonstration	RCHD	57.30%	11.66%	1.77%**	32	199
		Eligible Non-Participants	55.53%	15.25%		705	4,983
Medicare Swing Bed Revenue Share							
MMA	Baseline	RCHD	6.86%	8.24%	2.35%*	16	48
		Eligible Non-Participants	4.52%	6.30%		912	2,281
	Demonstration	RCHD	13.07%	17.06%	10.56%***	16	100
		Eligible Non-Participants	2.51%	4.57%		705	4,972
ACA	Baseline	RCHD	3.69%	3.99%	0.98%	16	48
		Eligible Non-Participants	2.71%	5.23%		414	1,130
	Demonstration	RCHD	12.90%	14.55%	10.62%***	16	99
		Eligible Non-Participants	2.28%	4.46%		502	2,590
MMA & ACA	Baseline	RCHD	5.28%	6.64%	1.36%*	32	96
		Eligible Non-Participants	3.92%	6.03%		1,008	3,411
	Demonstration	RCHD	12.99%	15.82%	10.47%***	32	199
		Eligible Non-Participants	2.51%	4.57%		705	4,972

Notes: The baseline periods are as follows: FY 2002–2004 (MMA), FY 2008–2010 (ACA), and FY 2002–2004 and FY 2008–2010 pooled (MMA and ACA). The demonstration periods are as follows: FY 2005–2017 (MMA), FY 2011–2017 (ACA), and FY 2005–2017 (MMA and ACA). SD denotes standard deviation, N_h denotes number of hospitals, and N_{obs} denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. All financial indicators were calculated from HCRIS data using the technical specifications described in Exhibit 3.1. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data. Means for aggregate periods are the simple average of year-specific means.

*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

Source: HCRIS, FY 2002–2017.

Among the three Medicare revenue financial indicators we analyzed, the most notable change was in the Medicare swing bed revenue share of participant hospitals. For both cohorts combined, the share of Medicare revenue from swing beds increased by close to 8 percentage points between the baseline and demonstration periods. The increase was slightly higher for ACA cohort hospitals. Between the baseline and demonstration period, Medicare swing bed revenue share for non-participants decreased slightly.

In Appendix D (Exhibits D17–D22) we graphically compare trends in hospital financial conditions prior to and after the start of the demonstration for RCHD participants and two types of reference groups consisting of hospitals that do not participate. The three groups we compare are the eligible non-participant group (reference group in Topic Area 1, or Attributes); the comparison group (reference group in Topic Area 3, or Impact); and the RCHD participant group. The graphs help illustrate the importance of the comparison group for drawing causal conclusions about the impact of the demonstration. Comparison of baseline trends (2002-2004 for MMA cohort and 2008-2010 for ACA cohort) show financial margins of the eligible non-participants and participants differ substantially but are more comparable for the participant and comparison group. This is also generally the case for other financial indicators, such as long-term debt to capitalization. This implies that eligible non-participant trends are not a suitable counterfactual to assess what would have been the trends of participants had they not participated in the demonstration. Nevertheless, eligible non-participant trends are useful to understand how the financial condition of small, rural hospitals has evolved, on average, across the United States over the period of analysis.

4.3.2 Hospital Operational and Contextual Characteristics

In this section, we examine the operational and contextual characteristics of hospitals—at the hospital, market area, and county/state level—during the three-year baseline period prior to participation. We note characteristics that are overrepresented among participants because they may be important inputs for the matching algorithm in Topic Area 3 (Impact).

In this section, we also discuss how these characteristics changed over time, and specifically during the demonstration period relative to baseline. Characteristics with differential trends among participants vis-à-vis non-participants are important control variables for the DID analysis in Topic Area 3 (Impact), as changes in these outcomes, in addition to demonstration participation, may also potentially explain changes in financial outcomes.

4.3.2.1 Hospital Operational Characteristics

The hospital operational characteristics we analyzed in this section include organizational structure, patient volumes, inpatient discharges, and case-mix severity. Within organizational structure, we analyzed health system membership and the distribution of hospitals across three mutually exclusive categories—non-profit, for-profit, or public. In interviews, we also asked participants about their decision to participate in Accountable Care Organizations (ACOs).

Organizational structure. As shown in Appendix Exhibit D8, RCHD participants were no more likely than non-participants to belong to health systems at baseline. However, health system membership changed substantially between baseline and demonstration periods, and differentially so for MMA cohort vs. ACA cohort hospitals. Among hospitals in the MMA cohort, health system membership increased much more for RCHD participants between baseline and demonstration periods as compared to non-participants (an increase of 19 percentage points for participants vs. 7 percentage points for non-participants). For hospitals in the ACA cohort, health system membership dropped from 88% to 57% between baseline and demonstration periods, while for non-participants membership also dropped from 83% to 54% over the same period.

The differential trends noted above may reflect the tradeoffs hospitals may face when considering hospital system membership. In interviews, hospitals discussed important tradeoffs when it came to joining health systems; namely, that increased access to resources often had to be balanced against decisions that could be detrimental to the community such as cutting less profitable but necessary service lines. Four RCHD hospitals that were active in FY 2017 reported that they had recently joined larger health system networks to improve their financial sustainability and gain access to additional service lines, bulk purchasing options, and centralized administrative functions. One hospital reported that joining a larger network also opened up greater access to modern information technology and electronic health record systems. This hospital was also able to expand and enhance existing service lines, including primary care and obstetric services, after joining the network. Other hospitals reported evaluating, or being prepared to evaluate, evidence in favor of joining hospital systems in the future. In contrast, RCHD participants that are independent hospitals perceived themselves as better equipped to respond to local and community needs and to have the same access to service lines or greater access than they would if they were part of larger health systems. For example, two hospitals expressed concern that if a larger health system took over the facility, it would cut service lines, leading to significant increases in drive times for local patients to receive those services. In addition, some independent hospitals reported being able to access additional service lines by maintaining voluntary affiliations with other institutions without being owned by larger hospital systems.

Participants and non-participant hospital composition differed in hospital ownership, with non-profits composing nearly two-thirds of participants but less than half of eligible non-participants. At baseline, non-profit status among participants vs. non-participants was 63 percent vs. 43

percent for both cohorts combined (p<0.05). The proportion of non-profits remained stable across demonstration and baseline periods. After non-profit status, the next most common status was public, and very few hospitals were for-profit. In interviews, hospitals rarely discussed the tradeoffs of non-profit status or public versus private ownership. One public hospital mentioned that the requirement to publish board meeting notes online exposed the hospital's internal decision-making process to potential competitors. In addition, multiple public hospitals reported that they did not benefit from additional public funds due to their relationship with the county government. However, one public hospital reported benefitting from property taxes, which provide support for the hospital's charity care program, and confirmed that the local community perceives public ownership as more responsive to their unique health needs.

Of the 26 RCHD hospitals interviewed, 14 participate in Medicare ACOs, including Medicare Shared Savings Program (MSSP) ACOs, Next Generation ACOs, or Pioneer ACOs. Hospital ACO affiliation was also established via health care consultants such as Caravan Health, or ACOs affiliated with their health care systems. Most of the other hospitals joined ACOs within the last 3-5 years, although a few hospitals have participated in ACOs for more than eight years. Several hospitals indicated that they had recently switched ACOs or planned to switch soon.

RCHD hospital representatives were generally ambivalent about ACO participation because some ACOs share downside risk even if hospitals may receive shared savings or see improved continuity of care and data interoperability from ACO resources and coordination of care. One hospital indicated that with its ACO moving to a downside risk model, the hospital will drop from the program. Several hospitals acknowledged that the hospital, or the hospital's larger health care system, had received or expected to receive shared savings distributions as part of ACO participation. Hospitals also indicated that ACO participation improved their discharge planning and continuity of care. For instance, one participant hospital was able to "identify areas in greatest need" thanks to the data on covered Medicare lives attributed to the hospital by the ACO. Challenges with ACO participation reported by hospital interviewees included difficulty in attributing shared savings to specific hospitals within larger health care systems; not being able to benefit from cost savings obtained through improvements in outpatient care due to hospitals often not employing their own physicians and using locum physicians; and ACOs covering only a small share of hospitals' patient populations. Finally, the greatest challenge hospitals face in ACO participation is the purpose of the program itself—to reduce hospital admissions, an important source of hospital revenue. For example, one hospital reported a 30 percent decrease in Medicare emergency department visits and reduced utilization of high-cost imaging as a

result of ACO participation. However, the hospitals acknowledged that ACOs benefit patients and taxpayers and that tying payments to patient health instead of services is the "right thing to do."

Patient volumes, discharges, and patient profile. Hospitals choosing to participate in the RCHD had higher baseline volumes, as evidenced by higher baseline average daily censuses, number of beds, and discharges. Participant hospitals had a higher average daily census for acute care beds (15 patients per day for participants vs.13 patients per day for non-participants) and more acute care beds (42 for participants vs. 35 for non-participants). In addition, this was generally true for MMA and ACA cohort hospitals analyzed separately. At baseline, average daily census for swing beds was statistically significantly higher among participants for hospitals in the ACA cohort only.

For both cohorts combined, the average daily census for acute care beds between the baseline and demonstration period declined for participants (by 1.37 patients per day) whereas for non-participants it increased (by 0.07 patients per day). This differential trend was driven by hospitals in the ACA cohort. On the other hand, overall, the average daily census for swing beds declined more among non-participants. These changes possibly reflect RCHD hospitals' decisions to shift some care to swing beds given the payment features of the model. In the interviews, several hospitals discussed the RCHD's favorable reimbursement for swing beds as beneficial for their finances. The total number of acute care beds also declined among participants and increased among non-participants (a decline of -2.10 beds among participants vs. an increase of 0.55 beds among non-participants). These results are shown in Appendix Exhibit D9.

Hospital respondents mentioned that inpatient volumes have been declining over time due to technologies that allow services to be provided in outpatient settings and to programs, such as ACOs, that incentivize preventive and outpatient care. One hospital pointed out that even though some inpatient specialties may have high profits, rural hospitals cannot always realize that profit because the high cost of labor may not be offset by revenue from the most complex, high-cost surgeries, which tend to be referred to larger hospitals. Why was there a larger decline in volumes among RCHD participants compared to non-participants? One possibility is that RCHD hospitals had higher baseline volumes and hence had more "room" to shrink. This is also evidenced by the pattern that ACA cohort hospitals, specifically, had both higher baseline volumes and also stronger declines. A strong decline in system membership among ACA cohort hospitals may also have contributed to stronger declines in volumes for these hospitals.

Inpatient discharge volumes in participants and non-participants declined overtime with declines larger for participants than non-participants. Total discharges declined by 206 discharges per year for participants versus 19 discharges per year for non-participants. Declines in inpatient discharges were larger for Medicare and Medicaid patients as well, with Medicare discharges declining by 131 discharges per year for participants versus 65 discharges per year for non-participants. Medicaid discharges declined by 40 discharges per year for participants versus 23 discharges per year for non-participants. In each case, the stronger magnitude of decline among RCHD participants was driven by hospitals in the ACA cohort. Appendix Exhibit D10 presents data on inpatient discharges. The higher declines among RCHD participants may reflect the higher volumes at these hospitals before joining the demonstration. At baseline, inpatient discharges among participants were significantly higher relative to non-participants for Medicare, Medicaid, and total discharges. Medicare discharges were higher by 88 discharges per year and Medicaid discharges were higher by 61 discharges per year for participants relative to non-participants. In both cases, the discharge differential for participants was driven by ACA cohort hospitals. Total discharges were also higher (1,721 per year for participants vs. 1,400 per year for non-participants).

As is shown in Appendix Exhibit D11, at baseline RCHD participants served more clinically complex patients, as measured by the hospital case mix index. This index reflect the acuity of patients admitted for acute inpatient stays. The clinical complexity of patients increased for RCHD participants during the demonstration period, though non-participants also showed a similar increase. At baseline, RCHD participants were no less likely than non-participants to be DSHs. However, during the demonstration period, the incidence of disproportionate share declined dramatically for participants (from 73 percent at baseline to 46 percent), whereas it increased for non-participants.

4.3.2.2 Market-Area Characteristics

We define the market area of a hospital as the 35-mile radius around the hospital.

Relative to eligible non-participants, RCHD participants were found to be located in less competitive markets as measured by multiple indicators. At baseline, participants had fewer hospitals in their market area as compared to non-participants (four hospitals vs. six hospitals) and were farther away than non-participants from the nearest acute care hospital (24 miles

away vs. 19 miles away). This pattern was observed for hospitals belonging to both MMA and ACA cohorts. These results are presented in Appendix Exhibit D12.

We also examined the distribution of participants across three mutually exclusive market typologies—Competitive markets, Frontier markets, and Isolated markets. As discussed in Section 1.4, Competitive markets are areas where three or more acute care hospitals operate. Hospitals in Frontier and Isolated markets have more market power and have fewer than three hospitals in their market area. Frontier market areas differ from Isolated market areas in that the former have stable/growing populations whereas the latter have declining populations. As shown in Appendix Exhibit D13, for both cohorts combined, participant hospitals were less likely to be located in markets categorized as Competitive (61 percent Competitive among participants vs. 82 percent Competitive among non-participants). This pattern was observed for hospitals belonging to both cohorts but was more pronounced for MMA cohort hospitals.

> *"The thing that we're seeing impact our market is competition. [A local town] does have a hospital there, [a] Critical Access Hospital. They took our market on the west side of town with urgent care and specialty care. Then we also in the last two years have a privately owned, free-standing emergency center that opened up just down the street from us."*
>
> *— Hospital leadership*

In the interviews, hospitals discussed the nuanced nature of competition faced by them. Some RCHD respondents elaborated on the challenges of being located in Competitive markets. For example, one hospital referred to its health care market as "highly competitive" due to a local military hospital, several large tertiary hospitals in surrounding cities, and CAHs "scattered around." The hospital struggles to compete because it simply cannot provide the "bank of services" offered by the surrounding hospitals. One hospital indicated that there is a similar-size hospital just 20 minutes away and multiple private practices that compete with the hospital for primary care. Two hospitals within the same hospital system are in competitive environments with individuals traveling to larger cities or across state lines for more advanced care. Even hospitals in remote locations face competition; one hospital located in the mountains competes with multiple local providers and worries about other systems "trying to make entry" into its tight market.

Other hospitals indicated that they face more moderate competition. For example, one hospital reported being the only Level III trauma center within a 200-mile radius. Another hospital within a large hospital system reported that its main competition is a large hospital outside of the

system about an hour away, in addition to a local hospital within the same system. These hospitals tend to take on subspecialties that the hospital cannot handle, such as high-risk obstetrics, pediatric specialties, hand care, and cardiology, but about "20 percent of what leaves [the] community is stuff that could stay [with us]." Another hospital reported facing some competition with local hospitals, especially related to primary care and obstetric care, because the hospital has not historically offered those services. One hospital serving a large geographic area indicated that the hospital does not face competition from other hospitals, but there is a local surgery center that conducts outpatient surgeries. Another noted that its emergency department is highly regarded, but it struggles with wealthier hospitals in surrounding areas that have formed partnerships. One hospital also has faced moderate competition from two local CAHs.

A few RCHD hospitals reported very little competition, primarily because they offer a larger set of services. For example, one hospital located near one of the state's major highways is seen as a "regional center" because it provides advanced care. Another faces little competition with hospitals located 15, 50, and 60 miles away because these hospitals have less capacity and tend to refer patients to this hospital for specialty services. As reported by the hospital, "there's no competition up here. There's more work than all of us can accomplish." One hospital also noted there is "no real significant competition" because there are no large hospitals nearby, and the ones of similar size (or smaller) are still at least 60 miles away; one local hospital recently closed, and the interviewed hospital believes another is at risk of closure as well. A hospital located in a remote part of its state also indicated that it had no substantial competition because of mountainous terrain and a long drive time to other hospitals, a finding echoed by another hospital that reported its market is "pretty contained," given that the nearest cities are over an hour away. One hospital in a sparsely populated state also reported that "people [are] driving, eighty, a hundred miles on a regular basis coming here for inpatient surgery as well as outpatient services and diagnostics and oncology services." Another hospital reported that it operates as a regional center and thus has a "strong balance sheet"; two other hospitals have also seen an increase in market share due to adding specialties and the closure of several area providers, respectively.

Across the various market-area characteristics examined, the most notable change was noted for the market typology variable (Appendix Exhibit D13). For both cohorts combined, while the distribution of non-participant hospitals across the three categories (Competitive, Isolated, and Frontier) remained the same between baseline and demonstration periods, the proportion of

participants in Competitive markets declined during the demonstration period while the proportion in Isolated and Frontier markets increased.

4.3.2.3 County and State Characteristics

Hospitals choosing to participate in the RCHD were located in significantly less densely populated counties as compared to non-participants (baseline population density was 27 people per square mile for participants vs. 61 people per square mile for non-participants). One challenge of low population density, discussed by hospital leadership in interviews, was the inability of hospitals to attract and retain qualified staff. One hospital spoke about the difficulty of attracting qualified staff to rural areas, because the lower patient volume at rural hospitals makes it hard to support multiple physicians in each specialty. Therefore, the hospital cannot offer more desirable working hours and provider contract arrangements because providers must "do the whole gamut" in rural areas, including covering frequent call rotations. It has had to fill the gaps with locum physicians, particularly for obstetrics (OB) care and pediatrics: "In OB, [it's] such a high population of Medicaid. So that's always a challenge . . . because of our struggle to retain some of the providers in that space, we've had to resort to the locum providers; thus our costs are going up extraordinarily and then [it becomes] a service that ends up in the red."

The sociodemographic composition of a hospital's market is related to its patient composition and the availability of local resources such as meals on wheels or area agencies on aging. Hospitals in areas with higher median incomes and lower poverty rates may be more likely to attract patients with more generous coverage providing higher margins. Participating hospitals were located in more educated counties (54 percent of the population had more than high school education counties of participants, whereas 41 percent of the population had more than high school education in counties of non-participants) and in counties with a higher proportion of non-Hispanic white residents (84 percent in counties of participants vs. 79 percent in counties of non-participants). Counties in which RCHD participants were located had a similar proportion of residents 65 years of age and older as non-participants. These patterns were true for MMA and ACA participants. These results for county population characteristics are presented in Appendix Exhibit D14.

Both cohorts of RCHD participants were located in counties with lower poverty rates, with lower unemployment rates, and with higher median household incomes and higher median home values, when compared to non-participants. For both cohorts combined, the baseline

percentage of residents below 150 percent of the poverty line was 23 percent for participants and 29 percent for non-participants; the baseline unemployment rate was 6 percent for participants vs. 7 percent for non-participants; the median household income was $53,350 for participants vs. $47,440 for non-participants; and the median home value was $113,000 for participants vs. $83,000 for non-participants. These results for county economic characteristics are presented in Appendix Exhibit D15.

Most sociodemographic characteristics examined at the county level did not change differentially between participants and non-participants across baseline and demonstration periods. One indicator, household median income, increased for counties in which participants are located but declined for non-participants' counties.

Medicaid coverage in the state in which a hospital is located (Appendix Exhibit D16) is an important variable to contextualize its financial performance because the lack of Medicaid coverage affects the extent to which the hospital may be serving uninsured residents. At baseline, this variable was not a qualitatively important differentiator between participants and non-participants, as the baseline period for this evaluation (FY 2002–2004 for the MMA cohort and FY 2008–2010 for the ACA cohort) was generally prior to Medicaid expansion under the Affordable Care Act, which primarily took place starting in 2014.[66]

Notably, states in which RCHD hospitals are located were more likely to have expanded Medicaid compared to states of non-participant hospitals (Appendix Exhibit D16). Because Medicaid expansion is hypothesized to have a positive impact on hospitals' finances, this variable is an important control for the DID regressions in Topic Area 3 (Impact). In interviews, RCHD hospital representatives in states that did not expand Medicaid tended to voice support for Medicaid expansion in the future to help reduce uncompensated care and to ward off rural hospital closures in their states. Several hospitals also identified high-deductible health plans on Affordable Care Act marketplaces as an additional stressor because patients' inability to pay cash for costly visits adds to the hospitals' charity care burden and may also lead to patients delaying necessary care. In some states, the marketplace has few options and limited demand; one hospital reported that the only two health plans available on its exchange have very high deductibles and that both charity care and bad debt write-offs have increased, even though the hospital's state expanded Medicaid.

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[66] Note that we also look at early, pre-Affordable Care Act expansion in the 2010–2014 period, which accounts for non-zero baseline values for this variable in some cases in Appendix Exhibit D16.

Hospital representatives also spoke, more generally, about changes in health insurance markets that have affected their finances over time. Hospital representatives reported downward pressure on reimbursement rates from both public and private insurers. As a result, hospitals were more limited in their ability to cross-subsidize across different lines of business. One interviewed hospital stated, "It used to be that [in] Medicare and Medicaid, we would receive enough from the commercial [insurance] at least to offset the loss and we certainly don't have that anymore." One system reported losing money on "every governmental patient" and no longer being able to rely on the revenue from commercially insured patients to make up the difference.

Most hospitals reported that there was little competition in their local or regional private insurance markets, which puts downward pressure on reimbursement rates and limits hospitals' ability to negotiate or push back against administrative demands, including onerous appeal and claim denial processes. At least one hospital reported the need to fight insurers on appeals and the pressure to push inpatient procedures to less costly outpatient settings. Some hospitals noted similar challenges in working with Medicaid managed care organizations (MCOs) and obtaining prompt reimbursement. At least two hospitals mentioned significant turnover in the MCO market, leading to unfulfilled claims and lack of continuity in coverage for patients. These hospitals also noted that dealing with a particular Medicaid MCO's low reimbursement rates, frequent claim denials, and overall market power remained an uphill struggle.

4.4 Reasons for Exiting from the RCHD

Between FY 2005 and FY 2017, 16 hospitals exited from the RCHD. Of these, two hospitals closed, eight withdrew prematurely, and six discontinued participation when the RCHD was

reauthorized under a new authorization. The location of these hospitals is shown in Exhibit 1.1 in chapter 1 of this report.[67]

In Section 4.4.1 below we discuss hospitals' considerations when choosing to participate in the RCHD vs. other Medicare payment systems and why hospitals that exited the RCHD decided to opt for other payment systems. In Section 4.4.2 we briefly discuss hospitals that closed.

4.4.1 Participation in the RCHD and Other Medicare Payment Systems

Hospitals reported that they made participation decisions based on the results of internal or contracted financial analyses, weighing the anticipated benefit of joining the RCHD relative to other Medicare payment programs, or their lack of eligibility for other programs. Some hospitals that were ineligible for other programs indicated that joining the RCHD was a "no-brainer" due to its financial benefits.

> *"We don't qualify for Critical Access and we don't qualify for Sole Community Hospital because of the mileage limitations that we have. So those are not viable options. So, the rural demo was really the only thing we have left to try."*
>
> *— Hospital Leadership*

Hospitals that met the requirements of other payment systems tended to rely on financial forecasting to determine the benefits of RCH payments in relation to other programs. Some hospitals reported being in constant flux on whether the RCH or other payment options were most advantageous: "We're always simultaneously qualifying for both [the RCH and Medicare-Dependent Hospital status]. It's all about the volume and the acuity levels of the patient as to which will reimburse us better through the Medicare program." While some hospitals that joined the RCHD under the ACA or CCA simply did not know about the demonstration earlier, or their states did not qualify, a handful indicated that the RCH payment program became a more viable option as their volumes and margins continued to drop.

Exhibit 4.4: Exiting Hospitals (Hospitals That Participated in the RCHD but Withdrew, Discontinued Participation, or Closed by FY 2017)							
Cohort	Hospital	RCHD Start Date	RCHD End Date	Reason for Exit	Prior Payment	Eligible for	Status after Leaving RCHD
MMA	Beatrice Community Hospital	10/1/2004	11/30/2005	Withdrew	SCH	340B	CAH

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[67] Note that Exhibit 1.1 shows 17 hospitals as exiting. One hospital (Mercy Hospital, Fort Scott) exited after the analytic timeframe of this evaluation and is therefore not discussed in this section.

Exhibit 4.4: Exiting Hospitals (Hospitals That Participated in the RCHD but Withdrew, Discontinued Participation, or Closed by FY 2017)

Cohort	Hospital	RCHD Start Date	RCHD End Date	Reason for Exit	Prior Payment	Eligible for	Status after Leaving RCHD
MMA	Community Hospital	7/1/2005	11/30/2005	Withdrew	SCH		CAH
MMA	Lexington Regional Health Center	7/1/2005	11/30/2005	Withdrew	SCH	340B	CAH
MMA	Phelps Memorial Health Center	1/1/2005	11/30/2005	Withdrew	SCH	340B	CAH
MMA	Holy Rosary Healthcare	6/1/2005	12/31/2008	Withdrew	SCH	340B	First SCH, then CAH
MMA	Spearfish Regional Hospital	7/1/2005	6/30/2009	Withdrew	SCH	340B Terminated LVA DSH SCH	SCH
MMA	St. Joseph's Hospital	7/1/2008	6/30/2009	Withdrew	SCH		CAH
MMA	Holy Cross Hospital	6/1/2005	5/31/2010	Discontinued	SCH	340B LVA DSH SCH	SCH
MMA	Northern Montana Healthcare	7/1/2005	6/30/2010	Discontinued	SCH	340B LVA DSH SCH	SCH
MMA	Holy Infant Hospital	1/1/2009	10/31/2010	Closed	SCH		Closed
ACA	Franklin Memorial Hospital	7/1/2011	6/30/2013	Withdrew	SCH	340B Terminated LVA DSH SCH	SCH
MMA	Banner Churchill Hospital	1/1/2005	12/31/2014	Discontinued	SCH	340B	CAH
MMA	Garfield Memorial Hospital	1/1/2005	12/31/2014	Discontinued	SCH	340B	First SCH, then CAH
MMA	Mt. Edgecumbe Hospital	10/1/2008	9/30/2015	Discontinued	Unknown	340B	First SCH, then CAH
ACA	Mercy Hospital – Independence	7/1/2011	6/30/2016	Closed	MDH	340B Terminated	Closed
ACA	Sterling Regional Medical Center	1/1/2012	12/31/2016	Discontinued	SCH	340B LVA DSH SCH	SCH

Notes: Eligibility for 340B refers to whether the hospital is an active 340B entity. Data on active 340B status were obtained from the HRSA Office of Pharmacy Affairs (OPA), 340B OPA Information System (OPAIS) database, in June 2020. "340B Terminated" refers to hospitals that previously had 340B status but lost eligibility either due to failure to recertify or to changing DSH percentages. CAH denotes Critical Access Hospital, DSH denotes

Disproportionate Share Hospital, LVA denotes low-volume adjustment, MDH denotes Medicare-Dependent Hospital, and SCH denotes Sole Community Hospital.
Sources: HCRIS, FY 2005–2017, and Medicare final settled cost reports, FY 2005–2017.

Critical Access Hospital (CAH). Of the eight hospitals that withdrew prematurely, six eventually became CAHs. Of the six hospitals that discontinued participation, three became CAHs. Four RCHD hospitals withdrew from the demonstration in 2005, when the 25-mile CAH distance requirement could still be waived by state governments. Some of the original hospitals that continued under the ACA extension were initially hesitant to become CAHs because they hoped to retain service lines and bolster utilization. However, all three opted to pursue CAH designation instead of continuing under the CCA authorization due to decreasing patient volumes and hospital margins.

While having CAH designation is arguably the program with the most advantageous financial arrangements, many RCHD hospitals do not meet the distance requirements. In other cases, the 25-bed restriction can be a challenge for hospitals with larger inpatient volumes. For example, one hospital that meets the CAH distance requirements reported that removing beds would not be viewed positively by a growing community that sees a major seasonal tourist influx and that is separated from other hospitals by challenging mountain roads. The decision to join the CAH program or remain in IPPS (or RCHD) can be a challenging one because hospitals struggle to predict long-term growth. One hospital reported that leadership chose not to become a CAH in 2006 because the PPS payment methodology remained the most favorable option at that time. When the hospital attempted to revisit the decision years later in the face of decreasing volumes, it was no longer eligible due to mileage restrictions.

Sole Community Hospital (SCH). The SCH program was also a common alternative to the RCHD. Eight hospitals became SCHs after exiting the demonstration (three of which eventually converted to CAH status), and slightly less than 30 percent of all RCHD hospitals had participated in the SCH program in the year prior to joining the demonstration. Two hospitals exited the RCHD when the SCH program rebased from FY 1996 costs to FY 2006 costs.

Hospitals that preferred participating in the RCHD vis-à-vis the SCH program either did not meet the SCH distance requirements (at least 35 miles from a like hospital) or found inpatient costs based on FY 2006 under the SCH program to be less favorable than the RCH payments. For example, one hospital reported, "Consistently when we work with our costs report preparers, I think we get a slightly higher rate on our Medicare inpatient admissions reimbursement [under the RCH payment] than we do as a Sole Community Hospital." Another indicated that the benefits of the RCHD versus SCH payment fluctuate by year, depending on hospital costs. The hospital respondent suggested that if a RCHD participant's costs are lower than both the target amount and PPS, CMS use the PPS payment as a floor, the way it does for SCH. As the respondent indicated, "we want to be able to not lose the incentive to cut cost".

> *"Without the rebasing it was looking like the MDH would be more beneficial. But once [the RCHD] rebasing occurred in 2017, the cost catch up put them into a target rate that was more comparable to the MDH specific rate and slightly better. So, it ended up moving us to stay within the demo project."*
>
> *– Hospital Leadership*

Medicare-Dependent Hospital (MDH). MDH is another Medicare payment system for RCHD hospitals. Two interviewed hospitals, both within the same health care system, considered dropping out of the demonstration to return to MDH status to improve financial viability.

Hospitals also reported on the tradeoffs of IPPS payment add-ons, including the low-volume adjustment (LVA). Hospitals reported that they continued to participate in the RCHD because payments were higher than they would be if the hospital received the LVA. For example, one hospital indicated that payments under MDH status with the LVA added resulted in about $1 million compared to the $2 million received under the RCHD. In addition, a handful of hospitals indicated that the RCHD seemed more stable than the LVA (see text box).

> *"We've always been awarded a low volume payment from Medicare, but again, that was not something that's even close to being guaranteed. It's kind of a one-off each year. And so the rural demonstration project gave us some sort of continuity to what our reimbursement was going to look like, so we could actually put plans together to take the organization out into the future."*
>
> *– Hospital Leadership*

4.4.2 Hospital Closures

Two RCHD hospitals exited the demonstration when they closed. Holy Infant Hospital, which closed in 2010, was located in Hoven, South Dakota, a town with a declining population of fewer than 1,000 people. When the hospital closed due to unsustainable operating costs, residents began traveling to neighboring hospitals for care, approximately 20–25 minutes away. Mercy Hospital – Independence, located in Independence, Kansas, closed in 2016 due to a declining population and competition from a nearby CAH and a regional hospital. A representative from the Mercy Health Care System noted that more closures were likely given that there was simply "not enough money" to sustain Kansas's many hospitals. Mercy Hospital – Fort Scott, also in Kansas, closed in 2019.

5 TOPIC AREA 2: PAYMENTS DISTRIBUTED: WHICH HOSPITALS RECEIVED WHAT LEVELS OF REIMBURSEMENTS?

In this section, we analyze how RCHD payments vary by hospitals' organizational and contextual characteristics and describe what payments were distributed under the RCHD to participant hospitals, relative to what they would have otherwise received under IPPS (including SNF PPS). In this section, RCHD payments include payments for Medicare inpatient acute care swing bed services. IPPS also includes SNF PPS unless otherwise stated.

The information in this section includes 32 hospitals (16 from the MMA cohort and 16 from the ACA cohort).[68] Furthermore, we present descriptive data for demonstration payments over time for all RCHD hospitals for which we have suitable data. In Sections 5.3 and 5.4 we present separate analyses by each authorization phase: FY 2005 to FY 2009 (MMA initial authorization), FY 2010 to FY 2014 (ACA extension), and FY 2015 to FY 2017 (CCA extension). Within the authorization or extension phase, we analyze the payments for all hospitals participating in the RCHD.

5.1 Key Findings

- **Higher base year costs per discharge were associated with additional RCHD payments over IPPS.** Regression results show that a $1,000 increase in cost per discharge in the base (or rebase) years was associated with a statistically significant $275,000 increase in RCHD payments over IPPS. This association is nonlinear, with hospitals in the highest cost per discharge quintile receiving an additional $3.3 million more in RCHD payments over IPPS, on average, than those in the lowest cost per discharge quintile.

- **Higher Medicare inpatient acute care discharges were associated with additional RCHD payments over IPPS.** An additional Medicare inpatient acute care discharge was

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[68] St. Joseph's hospital participated in FY 2008. The hospital was missing cost report data for July 1, 2008 to June 30, 2009 and was completely excluded from the analysis in this section.

associated with an additional $3,000 in RCHD payments above IPPS levels. The relationship between acute care discharges and RCHD payments is nonlinear; hospitals in the highest discharge volumes receive significantly larger increases in RCHD payments than those with lower volumes. On average, hospitals in the highest acute care discharge quintile received additional RCHD payments over IPPS by $1.9 million more, than hospitals in the lowest acute care discharge quintile.

- **Higher Medicare swing bed[69] discharges were associated with additional RCHD payments over IPPS.** An additional Medicare swing bed discharge was associated with $7,000 in additional RCHD payments over IPPS, almost double the additional RCHD payments over IPPS associated with Medicare acute discharges. RCHD payment over IPPS are similarly larger at higher swing bed discharge volumes, with hospitals in the highest swing bed discharge quintile receiving RCHD payments over IPPS by $1.7 million higher than hospitals in the lowest swing bed discharge quintile.

- **Medicare acute care and swing bed discharges were associated with market type.** Hospitals in Isolated markets receive lower additional RCHD payments over IPPS than hospitals in Frontier or Competitive markets, but this association loses statistical significance once we control for the number of Medicare inpatient acute care and swing bed discharges**.** Therefore, the variation in additional RCHD payments over IPPS observed between hospital market types are primarily driven by underlying differences in discharge volume. Additional RCHD payments over IPPS per hospital and additional RCHD swing bed payments over SNF PPS per hospital were on average lower during FY 2005–2009 (MMA initial authorization) as compared to FY 2010–2014 (ACA extension) or FY 2015–2017 (CCA extension).

- **Additional RCHD acute care and swing bed payments over IPPS varied over time with lower additional payments during the MMA initial authorization.** On average, additional RCHD payments over IPPS per hospital were lowest during the MMA initial authorization period. Within each fiscal year, there was substantial variation in the RCHD payments over IPPS across participant hospitals.

- **Additional RCHD swing bed payments over SNF PPS varied over time with lower additional swing bed payments during the MMA initial authorization.** On average, additional RCHD swing payments over SNF PPS were the lowest during the MMA authorization period.

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[69] Unless explicitly stated, in this report, "swing bed" refers to the use of hospital beds in providing SNF care.

5.2 Relationship between Hospitals' Operational and Contextual Characteristics and RCHD Payments over IPPS

In this section we examine whether hospital operational and contextual characteristics were correlated with the additional RCHD payments over IPPS (including SNF PPS) that hospitals received. In Section 5.2.1 we use a descriptive analysis to explore the correlations between hospitals' operational and contextual characteristics and the additional RCHD payments over IPPS they receive. In Section 5.2.2 we use a multivariate regression analysis approach, which allows us to examine how each of the hospital and contextual characteristics is associated with additional RCHD payments over IPPS, holding all the other independent variables in the regression constant. In this section, we also explore whether the relationships between some of the variables are nonlinear.

The variables examined in this section are the ones more likely to affect the additional RCHD payments over IPPS that hospitals receive, as described by the conceptual model in Section 1.4. Results including the *full* set of hospitals' organizational and contextual characteristics are shown in Appendix Exhibits E1 and E8; these results are discussed in this section as needed.

5.2.1 Descriptive Analysis

Exhibit 5.1 shows additional RCHD over IPPS payment terciles (payment terciles hereafter) and selected hospitals' operational and contextual characteristics. Mean RCHD payments over IPPS in each payment tercile were as follows: $543,000 in the first tercile, $1.6 million in the second tercile, and $3.4 million in the third tercile. The variation in additional payments near the median for a tercile was higher in the third tercile versus the first tercile, as measured by the interquartile range. The payment terciles were constructed using hospital-year data, which means that in theory a hospital could be in different terciles in different years, but this does not happen in practice.

Base (or rebase) costs per discharge were positively correlated with the amount of the additional RCHD payment over IPPS hospitals received: Exhibit 5.1 shows that hospitals in

the first and second payment terciles had relatively similar average base year costs per discharge, at $9,640 and $9,380, respectively. By contrast, hospitals in the third payment tercile had a much higher average cost per discharge in base years, namely, $13,780. The slight positive association between costs per discharge at baseline and additional RCHD payments over IPPS is not surprising, as the target amount is a function of the cost per discharge in base (or rebase years).

The number of Medicare acute care discharges was positively correlated with the amount of additional RCHD payments over IPPS. Hospitals in the first, second, and third payment terciles had, on average, 528, 587, and 704 acute inpatient discharges, respectively. These analyses suggest higher volumes receive more than proportionately higher payments than those with lower volume.

The number of Medicare swing bed discharges was also positively correlated with the amount of additional RCHD payments over IPPS. Hospitals in the first, second, and third payment terciles had, on average, 32, 80, and 78 swing bed discharges, respectively. These relationships show that swing bed discharges appear to be positively correlated with additional RCHD payments over IPPS. This is consistent with the explanation in Section 1.1.2 and Appendix A.

The association between hospitals' contextual characteristics and additional RCHD payments over IPPS shows that most hospitals in Isolated markets received lower (first tercile) additional RCHD payments over IPPS. Hospitals with additional RCHD payments over IPPS in the first payment tercile were relatively equally distributed among the different market types, with 31.7 percent of these hospitals being in Competitive markets, 36.5 percent in Frontier markets, and 31.7 percent in Isolated markets. By contrast, hospitals in the second payment tercile were most likely to be in Competitive markets (76.2 percent), followed by 14.3 percent located in Frontier markets and 9.5 percent located in Isolated markets. Hospitals in the third payment tercile were also most likely to be in Competitive markets (50.8 percent), but there were many more Frontier hospitals in this payment tercile (38.1 percent) than in the second payment tercile. Only 11.1 percent of hospitals in this payment tercile were in Isolated markets.

Exhibit 5.1: Attributes of RCHD Hospitals, by Additional RCHD over IPPS Payment Tercile									
	Tercile 1 **Average ($ million) $: $0.54** **Range ($ million):** **-$0.13, $1.09**			**Tercile 2** **Average in ($ million): $1.61** **Range in ($ million): $1.09, $2.03**			**Tercile 3** **Average in ($ million): $3.49** **Range in ($ million): $2.07, $5.66**		
Hospital/Market Characteristics	Mean	Median	Interquartile Range	Mean	Median	Interquartile Range	Mean	Median	Interquartile Range
RCHD Payment Components									
Costs (in $1,000) per Discharge in Base or Rebase Year	9.64	8.12	3.67	9.38	8.41	1.61	13.78	12.31	7.62
Medicare Inpatient Acute Care Discharges	528.14	532.00	336.00	586.52	556.00	359.00	703.63	719.00	503.00
Medicare Swing Bed Discharges	32.22	0.00	42.00	79.97	77.00	113.00	77.97	49.00	152.00
Contextual Characteristics									
Market Typology: Competitive	31.75%			76.19%			50.79%		
Market Typology: Frontier	36.51%			14.29%			38.10%		
Market Typology: Isolated	31.75%			9.52%			11.11%		

Notes: (1) Data from 189 settled cost reports were used for this analysis. Eight cost reports were excluded from this analysis, as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least one cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis, as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) The first tercile includes 14 unique hospitals and 63 hospital-years, the second tercile includes 11 unique hospitals and 63 hospital-years, and the third tercile includes 7 unique hospitals and 63 hospital-years. (4) For hospitals that continue participation across extensions of the demonstration, the cost per discharge for inpatient acute care and swing beds changes to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs, and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharge. (5) Cells are blank when the attribute is a non-continuous binary indicator and lacks meaningful information on the median and interquartile range.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.

Appendix Exhibit E1 shows the relationship between additional hospital and contextual characteristics and the payment received by hospitals.

5.2.2 Multivariate Regression Analysis

The results presented in the previous section are descriptive, and thus do not consider the influence that multiple variables can simultaneously exert on RCHD payments. As discussed in Section 3.1.2.2, a multivariate regression framework allowed us to assess the amount of the variation in the additional RCHD payments over IPPS that is explained by variation in key independent variables of interest when other factors are accounted for. We analyzed the relationship between additional RCHD payments over IPPS and cost per discharge at base or rebase year, Medicare discharges for inpatient acute care and swing beds, and market type characteristics.

The results from estimating equation (1) are shown in Exhibit 5.2. In Appendix Exhibits E6–E10, we present additional analyses to test if the results in Exhibit 5.2 are sensitive to additional specifications. These additional analyses include (a) exploring whether the relationships described in Exhibit 5.2 are nonlinear,[70] (b) testing the explanatory power of hospital's market type when Medicare acute care and swing bed discharge information are excluded from the regression model, (c) including additional contextual characteristics, (d) including hospital fixed effects,[71] and (e) not clustering standard errors by hospital, which might demand too much from the data since we only have 33 RCHD hospitals and hence only 33 clusters.[72]

The results in Exhibit 5.2 are measuring the average association between additional RCHD payments over IPPS and base or rebase year costs per discharge, Medicare acute care and swing bed discharges, and contextual characteristics. However, the relationship between additional RCHD payments over IPPS and base or rebase year costs per discharge, and

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[70] A detailed summary of the categorical variables—identifying a specific range of values for each of the three covariates—is provided in Appendix Exhibits E3–E5.

[71] Appendix Exhibit E9 shows that including hospital fixed effects reduces our sample size from 189 to 185, as four hospitals only had one year of cost report data. In comparison with Exhibit 5.2, results are generally consistent in size and statistical significance, except for swing bed discharges (coefficient is close to zero and not statistically significant with p-value of 0.976). In addition, the direction of the difference in additional RCHD payments over IPPS between Isolated and Competitive markets and Frontier and Competitive markets is positive, but not statistically significant (p-values of 0.708 and 0.535, respectively).

[72] Appendix Exhibit E10 presents the results of the regression estimated in Exhibit 5.2, but instead of clustering standard errors at the hospital level, we used robust standard errors. In comparison with Exhibit 5.2, results are similar in direction, magnitude, and statistical significance with slightly narrower ranges for the 95 percent confidence intervals.

Medicare acute care or swing bed discharges, might be nonlinear. For instance, when comparing the additional RCHD payments over IPPS among hospitals with different base or rebase year levels of cost per discharge, there may be a certain threshold for base or rebase costs per discharge that trigger a higher target amount and thereby allow the hospital to receive higher additional RCHD payments over IPPS. To explore potential nonlinearities, we transformed the continuous independent variables into categorical variables that identified a range of values for each independent variable and tested if the association with the dependent variable was larger or smaller in different categories (ranges) of the independent variables. We used a data-driven approach to create five quintiles[73] where each group represents 20 percent of the range for the independent variables. We tested the difference in RCHD payments over IPPS between the first quintile (bottom 20 percent) and the other quintiles for each independent variable. The results of these analyses are shown in Appendix Exhibit E6.

Exhibit 5.2 and Appendix Exhibit E6 show that the RCHD payment amount (inpatient acute care and swing bed costs per discharge in base or rebase year, inpatient acute care discharges in current year, and swing bed discharges in current year) were all positively associated with the additional RCHD payments over IPPS hospitals received, and that these relationships are nonlinear.

Base or rebase year costs per discharge were positively associated with additional RCHD payments over IPPS. Between FY 2005 and FY 2017, the average base or rebase year cost per discharge per hospital was $10,934 with a standard deviation of $4,194. The results in Exhibit 5.2 show that a $1,000 increase in cost per discharge in the base year was associated with a statistically significant $275,000 increase in additional RCHD payments over IPPS**.**

Because there was a lot of variation in base or rebase year costs over time and across hospitals,[74] we explored whether the relationship between cost per discharge in base or rebase

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[73] Quintiles are based on the distribution of the continuous independent variable and identify the rank of each observation in five groups. The first quintile identifies observations that fall at the bottom 20 percent of the distribution for each continuous independent variable, the second quintile identifies observations between the 20th and 40th percentile, the third quintile identifies observations between the 40th and 60th percentile, the fourth quintile identifies observations between the 60th and 80th percentile, and the fifth quintile identifies observations at the top 20 percent of the distribution.

[74] In Appendix Exhibit E2, we present the yearly base or rebase year cost per discharge summary statistics among participant hospitals in the sample. Exhibit E2 shows that base or rebase cost increased over time. Between FY 2005 and FY 2009 (MMA initial authorization period), the average base or rebase year cost per

years and additional RCHD payments over IPPS was nonlinear in Appendix Exhibit E6 using quintiles to classify hospitals depending on whether their costs per discharge were in one of the following cost per discharge quintiles:[75] (a) $3,730 to $7,880 (first quintile); (b) $7,980 to $8,520 (second quintile), (c) $8,580 to $10,870 (third quintile), (d) $10,920 to $14,250 (fourth quintile), and (e) $14,310 to $23,430 (fifth quintile).

The results of the analyses in Appendix Exhibit E6 shows that hospitals in the third, fourth, and fifth quintiles received larger RCHD payments over IPPS compared to hospitals in the lowest base or rebase year cost per discharge quintile:

- Hospitals in the second cost per discharge quintile received higher additional RCHD payments over IPPS by $360,000, but this difference was not statistically significant (*p*-value: 0.334).
- Hospitals in the third, fourth, and fifth cost per discharge quintiles received higher additional RCHD payments over IPPS by $1.1 million, $1.4 million, and $3.3 million, respectively; these differences were all statistically significant (*p*-values: 0.024, 0.000, and 0.000, respectively).

Medicare inpatient acute care discharges were positively associated with additional RCHD payments over IPPS. Between FY 2005 and 2017, the average number of Medicare inpatient acute care discharges per hospital was 606 discharges, with a standard deviation of 291 discharges. The results in Exhibit 5.2 show that an additional Medicare inpatient acute care discharge per year was associated with a $3,000 increase in additional RCHD payments over IPPS.

We explored if the relationship between Medicare inpatient acute care discharges and additional RCHD payments over IPPS was nonlinear in Appendix Exhibit E.6, using quintiles to classify hospitals depending on whether their Medicare inpatient acute care discharges were in one of the following quintiles:[76] (a) 0 to 397 discharges (first quintile); (b) 400 to 529 discharges

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discharge per hospital was $9,200 with a standard deviation of $2,600. Between FY 2010 and FY 2014 (ACA extension), the average base or rebase year cost per discharge per hospital was $11,300 with a standard deviation of $4,500. Between FY 2015 and FY 2017 (CCA extension for continuing hospitals), the average base or rebase year cost per discharge per hospital was $12,200 with a standard deviation of $4,500.

[75] Information about the average, standard deviation, minimum, and maximum base or rebase year cost per discharge by quintile is presented in Appendix Exhibit E3.

[76] Information about the average, standard deviation, minimum, and maximum Medicare inpatient acute care discharges by quintile is presented in Appendix Exhibit E4.

(second quintile); (c) 530 to 681 discharges (third quintile); (d) 690 to 857 discharges (fourth quintile); and (e) 863 to 1,293 discharges (fifth quintile).

The results of the analyses in Appendix Exhibit E6 show that hospitals in the fourth and fifth quintiles received larger additional RCHD payments over IPPS compared to hospitals in the lowest Medicare inpatient acute care discharge quintile:

- Hospitals with Medicare inpatient acute care discharges in the second and third discharge quintiles received higher additional RCHD payments over IPPS by $450,000 and $900,000, respectively. However, both differences were not statistically significant (*p*-values: 0.269 and 0.104, respectively).
- Hospitals with Medicare inpatient acute care discharges in the fourth and fifth quintiles received higher additional RCHD payments over IPPS by $2 million and by $1.9 million respectively; both differences were statistically significant (*p*-values: 0.001 and 0.015, respectively).

Medicare swing bed discharges were positively associated with additional RCHD payments over IPPS. Between FY 2005 and 2017, the average number of Medicare swing bed discharges per hospital was 63 discharges with a standard deviation of 77 discharges. The results in Exhibit 5.2 show that an additional Medicare swing bed discharge was associated with a $7,000 increase in additional RCHD payments over IPPS**.** The finding that additional Medicare swing bed discharges were associated with higher additional RCHD payments over IPPS than Medicare acute care bed discharges is consistent with the RCHD payment methodology in Section 1.1.2 and Appendix A.

We explored whether the relationship between Medicare swing bed discharges and additional RCHD payments over IPPS was nonlinear in Appendix Exhibit E6, using quintiles to classify hospitals depending on whether their Medicare swing bed discharges were in one of the following swing bed discharges quintiles:[77] (a) 0 discharges (first quintile); (b) 2 to 23 discharges (second quintile); (c) 24 to 57 discharges (third quintile); (d) 59 to 132 discharges (fourth quintile); and (e) 134 to 638 discharges (fifth quintile).

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[77] Information about the average, standard deviation, minimum, and maximum Medicare swing bed discharges by quintile is presented in Appendix E Exhibit E5.

The results of the analyses in Appendix Exhibit E6 show that hospitals in the third, fourth, and fifth quintiles received larger additional RCHD payments over IPPS compared to hospitals in the lowest Medicare swing bed discharges quintile:

- Hospitals in the second swing bed discharge quintile received lower additional RCHD payments over IPPS by $680,000, but the difference was not statistically significant (p-value: 0.352).
- Hospitals in the third, fourth, and fifth quintiles received higher additional RCHD payments over IPPS by $1.3 million, $1.7 million, and $1.7 million, respectively; all three differences were statistically significant (p-values: 0.024, 0.000, and 0.004, respectively).

Hospital contextual characteristics were not significantly[78] associated with associated with additional RCHD payments over IPPS after controlling for acute care and swing bed discharge differences. The magnitude and statistical significance of the relationship between hospital costs and acute care and swing bed discharges were robust to the inclusion of the additional hospital and socioeconomic characteristics described in Exhibit 5.2.

Exhibit 5.2 also shows that there was no statistically significant difference in additional RCHD payments over IPPS between hospitals in the three market type categories.

- Compared to hospitals in Competitive markets, hospitals in Isolated markets received lower additional RCHD payments over IPPS, but this difference was not statistically significant (p-value: 0.331).
- Compared to hospitals in Competitive markets, hospitals in Frontier markets received lower additional RCHD payments over IPPS, but this difference was not statistically significant (p-value: 0.958).

In all specifications, there was no statistically significant difference in RCHD payments over IPPS between hospitals in Competitive and Frontier markets. Additional regression results in Appendix Exhibit E7 show that when the number of Medicare inpatient acute care and Medicare swing bed discharges are not included in the regression, hospitals in isolated markets received $1.14 million ($p$-value: 0.024) lower additional RCHD payments over IPPS compared to hospitals in Competitive markets. However, when we include the number of discharges in the regression the statistical significance changes and the size of the coefficient estimate

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[78] In this case we are defining significance as statistically significant where the p-values associated with the hospital contextual characteristic coefficients in the multi-variate regression have be less than 0.10.

decreases. Since the number of discharges and the market typology variables are highly correlated (hospitals in Isolated markets have substantially lower discharges than hospitals in Competitive markets), including both sets of variables in the regression reduces the explanatory power of the market typology variables. In this case, although there is a statistically significant relationship between market typology and RCHD payments when including only base cost in the model, this result is not statistically significant when adding discharges. Our preferred specification is the one described in Exhibit 5.2 because omitting the number of discharges might result in biased coefficients; however, we wanted to illustrate how the exclusion of that variable affects the relationship between the market typology variables and the additional RCHD payments hospitals received.

Finally, Appendix Exhibit E8 shows that the association between the market category variables and the RCHD payment relative to IPPS changes direction and remains not statistically significant when including other contextual characteristics such as unemployment rate, poverty rate, and racial composition. Compared to hospitals in Competitive markets, hospitals in Isolated markets were associated with higher additional RCHD payments over IPPS (*p*-value: 0.205), and hospitals in Frontier markets were associated with higher additional RCHD payments over IPPS (*p*-value: 0.131). This implies that the market type categories we constructed are a reasonable proxy for some of these broader socioeconomic characteristics of hospitals.

Exhibit 5.2: Multivariate Regression Analysis of Association between RCHD Payment Components, Market Type, and Additional RCHD Payments over IPPS			
Dependent Variable: *RCHD Payments over IPPS (million $)*			
Independent Variables: Hospital and Contextual Characteristics	**Coefficient (Standard Error)**	**95% Confidence Interval**	**p-value**
RCHD Payment Components			
Cost per Discharge in Base or Rebase Year (thousand $)	0.275 (0.06)	[0.143, 0.41]	0.000
Medicare Inpatient Acute Care Discharges	0.003 (0.001)	[0.001, 0.004]	0.005
Medicare Swing Bed Discharges	0.007 (0.003)	[0.001, 0.012]	0.020
Market Typology			
Isolated Hospital (reference group: Competitive Hospital)	-0.426 (0.431)	[-1.304, 0.453]	0.331
Frontier Hospital (reference group: Competitive Hospital)	-0.037 (0.699)	[-1.462, 1.388]	0.958
N (Total Hospital Cost Reports) Unique Hospitals Adjusted R Squared	189 32 0.555		

Summary Statistics			
Variable	Mean (Standard Deviation)	Median	[Min, Max]
Additional RCHD Payments over IPPS (million $)	1.879 (1.704)	1.566	[-0.938, 10.275]
Cost per Discharge in Base or Rebase Year (thousand $)	10.934 (4.194)	9.406	[3.727, 23.431]
Medicare Inpatient Acute Care Discharges	606.101 (291.040)	560.000	[0.000, 1293.000]
Medicare Swing Bed Discharges	63.386 (77.378)	44.000	[638.000, 0.000]
Competitive Hospital	52.910% (50.048%)		
Isolated Hospital	17.460% (38.064%)		
Frontier Hospital	29.630% (45.784%)		

Notes: *(1) Data from 189 settled cost reports were used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least one cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For the four hospital year observations (two hospitals) missing base year inpatient acute care discharge information but with non-zero base year costs for inpatient acute care services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data are available. A dummy variable was included in the regression to identify the observations. (4) For the 21 hospital year observations (five hospitals) missing base year swing bed discharge information but with non-zero base year costs for swing bed services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data are available. A dummy variable was included in the regression to identify the observations. (5) Cells are blank when the independent variable is a non-continuous binary indicator and lacks meaningful information on the median, minimum, and maximum. (6) The regression also included year fixed effects to account for contemporaneous changes that affect all hospitals over time. (7) The standard errors were robust clustered at the hospital level as 28 hospitals had more than one year of cost report data.*

Source: *Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.*

5.3 Additional RCHD Payments over IPPS, by Fiscal Year

In this section, we explore the distribution of hospitals' additional RCHD payments for inpatient acute and swing bed services over what hospitals would have received under IPPS between FY 2005 and FY 2017. In this section, RCHD payments include payments for Medicare inpatient acute care services and payments for swing bed services. IPPS also includes SNF PPS unless otherwise stated.

We present separate analyses by each authorization phase: FY 2005 to FY 2009 (MMA initial authorization), FY 2010 to FY 2014 (ACA extension), and FY 2015 to FY 2017 (CCA extension for continuing hospitals). The CCA authorization extension phase started in the year 2015 for hospitals that decided to continue in the demonstration from the MMA or ACA cohorts. New

hospitals under the CCA authorization extension first joined in FY 2018, and those hospitals are not included in this analysis.

Hospitals joined the RCHD in different years[79] and exited at different points during the period of analysis.[80] In addition, some hospitals were missing cost reports in some years. As a result, some of the year-to-year variations described below might be due to some hospitals entering or exiting the demonstration.

On average, between FY 2005 and FY 2017, RCHD payments to participant hospitals were higher by $1.8 million per hospital per year than what hospitals would have received under IPPS. The magnitude of the additional RCHD payments varied significantly across fiscal years, ranging from $1.4 million to $2.4 million. Based on the regression results presented in Section 5.2.2, 56% of this variation is explained by differences in base or rebase year cost per discharge, Medicare acute care discharges, and Medicare swing bed discharges.

There is large variation in additional RCHD payments over IPPS by fiscal year: Exhibit 5.3 shows additional RCHD payments over IPPS in millions of dollars and in percentage[81] terms per hospital by fiscal year (between FY 2005 and FY 2017). During the period of analysis, the year-to-year variation was large: participant hospitals received, on average, between $1.4 million per hospital (in FY 2011) and $2.4 million per hospital (in FY 2017). Exhibit 5.3 shows that the yearly percentage increase in RCHD payments relative to IPPS also varied widely, from 29.7 percent in FY 2007 to 55.6 percent in FY 2010. FYs 2005, 2009, 2010, 2011, 2015, 2016, and 2017 were base or rebase years in which hospitals were paid on cost. Some of these years had among the highest percentage increases—for example, FY 2010 (55.6 percent) and FY 2017 (47.2 percent).

Some of the year-over-year variation is likely due to the differing number of hospital cost reports used for the analysis in each fiscal year. The number of hospitals in each fiscal year ranged from nine hospitals (FY 2006, FY 2007, FY 2008, FY 2010) to 23 hospitals (FY 2012) depending

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[79]Thirteen hospitals joined in FY 2005; three in FY 2009; 10 in FY 2011; and six in FY 2012.

[80] Sixteen hospitals exited during the period of analysis, including four hospitals that exited in FY 2006, two in FY 2009, two in FY 2010, one in FY 2011, one in FY 2013, three in FY 2015, one in FY 2016, and one in FY 2017.

[81] Percentage increase in RCHD payments relative to IPPS = $\frac{RCHD_{Diff}}{IPPS+SNF\ PPS}$ where $RCHD_{Diff} = RCHD - (IPPS + SNF\ PPS)$.

on the hospitals that were part of the RCHD and the cost reports available at the time of this first interim report.

Additional RCHD payments over IPPS increased in each new authorization phase. On average, *additional RCHD payments over IPPS* per hospital were highest between FY 2015 and FY 2017 (the first three years of the CCA authorization extension)[82] and lowest between FY 2005 and FY 2009 (the MMA authorization period). It should be noted that hospitals in the first years of the CCA authorization phase are rebase years, which could explain why payments are higher during these years. The *percentage increase in RCHD payments relative to IPPS* per hospital was highest between FY 2010 and FY 2014 (the ACA authorization extension) and lowest between FY 2005 and FY 2009 (the initial MMA authorization period).

- Between FY 2005 and FY 2009 (initial MMA authorization period), *RCHD payments over IPPS* ranged from $1.4 million per hospital (in FY 2009) to $1.9 million per hospital (in FY 2008). The *percentage increase in RCHD payments relative to IPPS* per hospital ranged from 29.8 percent (in FY 2007) to 44.9 percent (in FY 2009) during this period.

- Between FY 2010 and FY 2014 (ACA authorization extension period), *RCHD payments over IPPS* ranged from $1.7 million per hospital (in FY 2012) to $2.1 million per hospital (in FY 2014). The *percentage increase in payment from RCHD relative to IPPS* per hospital ranged from 33.6 percent (in FY 2011) to 55.6 percent (in FY 2010) during this period.

- Between FY 2015 and FY 2017 (CCA authorization extension for continuing hospitals) *RCHD payments over IPPS* ranged from $1.4 million per hospital (in FY 2016) to $2.4 million (in FY 2017). The *percentage increase in RCHD relative to IPPS* per hospital ranged from 32.6 percent (in FY 2016) to 47.2 percent (in FY 2017) during this period.

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[82] The CCA authorization extension phase started in the year 2015 for hospitals that decided to continue in the demonstration from the MMA or ACA cohorts. New hospitals under the CCA authorization extension first joined in FY 2018, and those hospitals are not included in this analysis.

Exhibit 5.3: Additional RCHD Payments over IPPS per Hospital & Percentage Increase in RCHD Payments over IPPS by Fiscal Year, FY 2005–2017
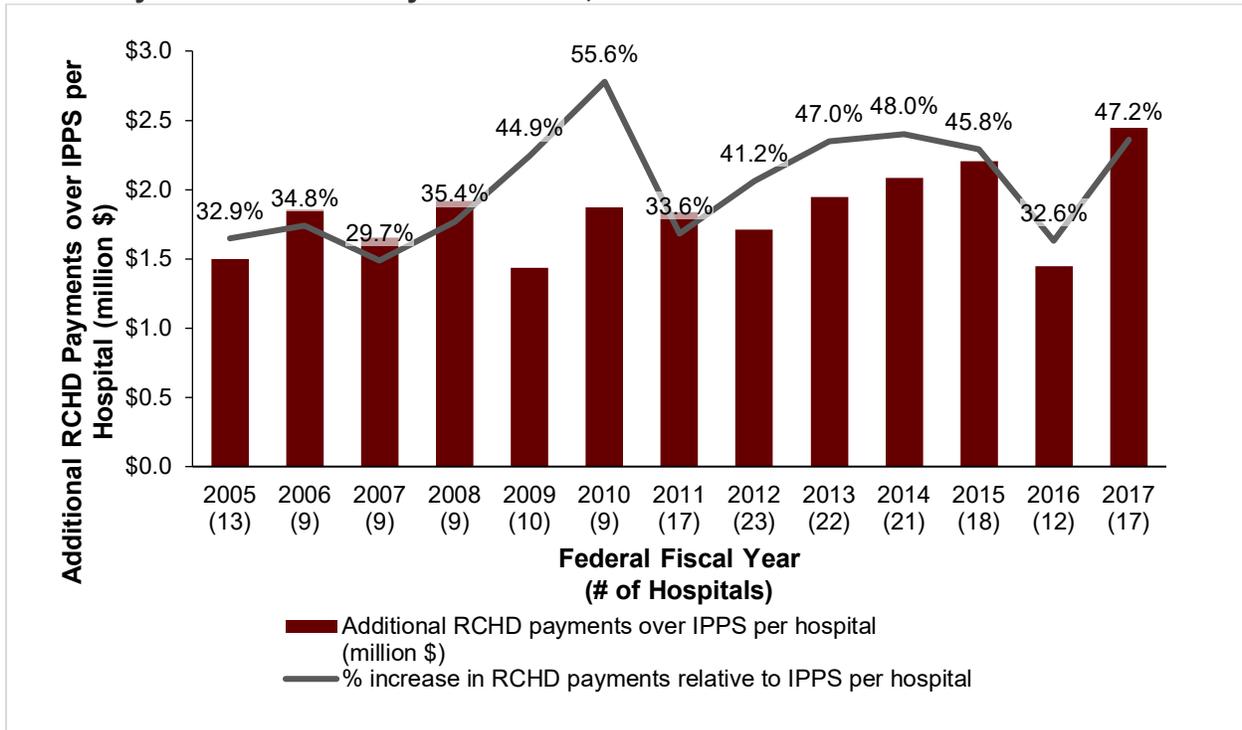
Notes: *(1) Numbers in parentheses show the number of RCHD hospital cost reports included in the calculations; in each fiscal year there was one cost report associated with each hospital. (2) Data from 189 settled cost reports were used for this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (3) The analysis included at least one cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing.*

Source: *Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.*

One of the findings in Section 5.2 is that higher additional RCHD payments over IPPS are correlated with higher Medicare acute care inpatient discharges. It is possible that the increase in RCHD payments over IPPS in each new authorization phase is an indication that hospitals had higher Medicare inpatient discharges in each new authorization phase. This is likely the case since participation in the RCHD during the initial MMA authorization phase was restricted to hospitals in the ten least populated states, which are likely to have low volume of discharges.

There is substantial variation in additional RCHD payments over IPPS between hospitals.
Within each fiscal year, there was substantial variation in the per-hospital additional RCHD payments over IPPS across participant hospitals. Exhibit 5.4 summarizes distributional information of the additional RCHD payments over IPPS between FY 2005 and FY 2017. The standard deviation of additional RCHD payments over IPPS per hospital ranged from $1.4 million (in FY 2011) to $2.8 million (in FY 2017). In FY 2011, additional RCHD payments over

IPPS among 17 participating hospitals ranged from $0.1 million to $5.6 million. The standard deviation reflects large variation between hospitals within a FY. For example, in FY 2017, the additional RCHD payments over IPPS among the 17 participating hospitals that year ranged from -$0.9 million to $10.3 million.

At the aggregate level, the standard deviation of the RCHD payments relative to IPPS in percentage terms ranged from 18.5 percent (in FY 2007) to 57.3 percent (in FY 2009). This standard deviation reflects large variation across hospitals within a given FY. For example, in FY 2007, the percentage increase in RCHD payments relative to IPPS among 9 participating hospitals ranged from 10.9% to 69.2%. In FY 2009, the percentage increase in RCHD payments relative to IPPS among 10 participating hospitals ranged from -2.3% to 185.5%.

Changes in the standard deviation over time could be driven by changes in the number of hospitals. However, we did not find any evidence that the highest or lowest standard deviation measures were in fiscal years with the highest or lowest numbers of participant hospitals. In FY 2011 and FY 2017, for instance, the standard deviation in RCHD payments over IPPS per hospital was calculated for the same number of hospitals—17 in both fiscal years. Similarly, the standard deviation in percentage increase in RCHD payments relative to IPPS was based on nine hospitals in FY 2007 and 10 hospitals in FY 2009. Year over year fluctuations in standard deviations can also be driven by base or rebase years and changes in the composition of participant hospitals (i.e. hospitals from isolated markets with low Medicare patient volumes or hospitals from competitive markets with high Medicare patient volumes).

The 25th percentile of the additional RCHD payments over IPPS ranged from $46,400 (in FY 2009) to $1.6 million (in FY 2015). The 50th percentile (median) of the additional RCHD payments over IPPS ranged from $685,000 (in FY 2009) to $2.0 million (in FY 2017). The 75th percentile of additional the RCHD payments over IPPS ranged from $1.6 million (in FY 2016) to $3.4 million (in FY 2010). Between FY 2005 and FY 2017, the median additional RCHD payments over IPPS increased from $1.2 million in FY 2005 to $2.0 million in FY 2017. Based on additional RCHD payments over IPPS at the 25th percentile and at the 75th percentile, the distribution widened between FY 2006 and FY 2012 and then narrowed between FY 2013 and FY 2016. Some of this is likely due to alterations in the composition of hospitals as new hospitals joined the RCHD as part of the ACA extension and simultaneously, some hospitals discontinued participation. In addition, changing macro-economic conditions such as the Great

Recession[83] (between calendar years 2007 and 2009) and the gradual recovery that followed likely impacted the volume of Medicare patients seeking inpatient acute and swing bed services disproportionately in some hospital market areas.[84]

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[83] Shambaugh, J & Strain, M. (2021). The recovery from the Great Recession: A long, evolving expansion. (NBER Working Paper No. 28452), Cambridge, MA: National Bureau of Economic Research.

[84] Dranove, D., Garthwaite, C., & Ody , C. (2015). The Economic Downturn And Its Lingering Effects Reduce Medicare Spending Growth by $4 Billion In 2009-12. Health Affairs, Vol. 34, No. 8: Variety Issue, 1368-1375. doi:https://doi.org/10.1377/hlthaff.2015.0100.

Exhibit 5.4: Additional RCHD Payments over IPPS by Fiscal Year, FY 2005–2017

Measure	Year 1 FY 2005	Year 2 FY 2006	Year 3 FY 2007	Year 4 FY 2008	Year 5 FY 2009	Year 6 FY 2010	Year 7 FY 2011	Year 8 FY 2012	Year 9 FY 2013	Year 10 FY 2014	Year 11 FY 2015	Year 12 FY 2016	Year 13 FY 2017
Additional RCHD Payments over IPPS per Hospital (million $)	$1.50	$1.85	$1.66	$1.92	$1.43	$1.87	$1.84	$1.71	$1.95	$2.09	$2.20	$1.44	$2.45
(Standard Deviation)	($1.39)	($1.69)	($1.55)	($1.79)	($1.94)	($1.78)	($1.38)	($1.50)	($1.53)	($1.58)	($1.74)	($1.42)	($2.82)
RCHD Payments Relative to IPPS per Hospital	32.89%	34.76%	29.75%	35.41%	44.87%	55.56%	33.62%	41.16%	46.99%	48.04%	45.76%	32.56%	47.18%
(Standard Deviation)	(18.9%)	(21.3%)	(18.5%)	(21.8%)	(57.3%)	(53.4%)	(26.8%)	(35.4%)	(35.6%)	(35.3%)	(33.9%)	(29.3%)	(47.5%)
25th percentile: Additional RCHD Payments over IPPS Plus SNF PPS (million $)	$0.51	$0.91	$0.70	$0.64	$0.05	$0.48	$0.82	$0.64	$1.10	$1.21	$1.57	$0.70	$0.53
50th percentile: Additional RCHD Payments over IPPS Plus SNF PPS (million $)	$1.17	$1.16	$1.13	$1.00	$0.69	$1.49	$1.59	$1.51	$1.64	$1.95	$1.98	$1.16	$2.01
75th percentile: Additional RCHD Payments over IPPS plus SNF PPS (million $)	$1.71	$2.20	$1.65	$2.69	$1.94	$3.39	$2.44	$2.74	$2.31	$2.34	$2.27	$1.62	$2.78
# of Hospitals	13	9	9	9	10	9	17	23	22	21	18	12	17

Notes: (1) Data from 189 settled cost reports were used for this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least one cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) Dollar values are expressed in terms of $1,000 dollars. (4) Appendix Exhibit E6 provides information on additional measures for RCHD payments over IPPS. (5) RCHD payments includes Medicare inpatient acute care and swing bed payments.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.

5.4 Additional RCHD Swing Bed Payment over SNF PPS, by Fiscal Year

In this section, we explore the distribution of hospitals' additional RCHD payments for swing bed services over what hospitals would have received under SNF PPS between FY 2005 and FY 2017 using only the information from settled hospital cost reports with swing bed discharges.[85] As in Section 5.3, in this section we present annual payments per hospital for swing bed discharges and the percent that the RCHD swing bed payment exceeds payments under SNF PPS. The data is presented across all hospitals with swing beds and separate analyses noting differences in swing bed payment in each authorization phase are presented.

Exhibit 5.5 shows the additional RCHD swing bed payments over SNF PPS (depicted as the portion of the bars colored in tan), calculated using only the information from RCHD hospitals with positive swing bed discharges.[86] To contextualize this information, Exhibit 5.5 also shows the additional RCHD payments (including payments for both inpatient care acute and swing bed services) over IPPS plus SNF PPS (depicted as red bars in the exhibit), which was also shown in Exhibit 5.3, and was calculated using the information from all RCHD hospitals. In addition, the exhibit shows the swing bed share of additional RCHD payments over IPPS (depicted as a line).

RCHD swing bed payments were higher than what hospitals would have received under SNF PPS. Between FY 2005 and FY 2017, RCHD swing bed payments to participant hospitals per hospital per year were on average higher than what hospitals would have received for swing bed services under SNF PPS by $712,000 (representing a 421% increase relative to SNF PPS). The average additional RCHD swing bed payment over SNF PPS per hospital varied across fiscal years from $383,000 (in FY 2005) to $964,000 (in FY 2015). Based on the regression analyses presented in Section 5.2.2, likely key drivers in this variation include differences in hospital base year or rebase year costs for swing bed services, market type, and swing bed discharge volume, which factor into their swing bed target amount, as well as hospitals' swing bed discharges. In general, hospitals receive higher additional RCHD payments over IPPS when they have more swing bed discharges by an average of $670,000.

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[85] Share of Additional RCHD Reimbursement from Swing Bed =

$$\frac{\text{additional RCHD swing bed payments over SNF PPS}}{\text{additional RCHD payments (acute care and swing bed) over IPPS plus SNF PPS}}.$$

[86] A total of 130 hospital year observations out of 189 were considered as having swing beds. These observations report positive swing bed discharges.

The swing bed share of additional RCHD payments over IPPS increased over time.

Between FY 2005 and FY 2017, swing bed share of additional RCHD payments over IPPS (swing bed share of additional payments) was, on average, 38.8 percent. The swing bed share of additional payments among all participant hospitals varied, ranging from 25.6 percent (in FY 2005) to 53.8 percent (in FY 2016). In FY 2005, among the 10 participating hospitals with swing bed discharges, the swing bed share of additional payments ranged from -2.1 percent to 178.0 percent. In FY 2016, among the 9 participating hospitals with swing bed discharges, the swing bed share of additional payments ranged from 10.2 percent to 86.0 percent.

Some of the variation in swing bed share of additional RCHD payments over IPPS could be due to fluctuations in the percentage of participant hospitals receiving RCHD swing bed payments. Between FY 2005 and FY 2015 this percentage ranged from 44.4 percent (four out of nine hospitals in FY 2010) to 82.4 percent (14 out 17 hospitals in FY 2017). In addition, fluctuations in the volume of swing bed discharges could also be a potential explanation.

There was an increase in additional RCHD swing bed payments over SNF PPS per hospital in each new authorization period. On average, additional RCHD swing bed payment over SNF PPS per hospital was highest between FY 2015 and FY 2017 (the first three years of the CCA authorization extension)[87] and lowest between FY 2005 and FY 2009 (during the MMA initial authorization period). On average, the swing bed share of additional RCHD payments over IPPS was highest between FY 2010 and FY 2014 (the ACA authorization extension) and lowest between FY 2005 and FY 2009 (during the MMA initial authorization period).

- Between FY 2005 and FY 2009 (initial MMA authorization period), additional RCHD swing bed payment over SNF PPS per hospital ranged from $380,000 (in FY 2005) to $570,000 (in FY 2009). The swing bed share of additional RCHD payments over IPPS per hospital ranged from 25.6 percent (in FY 2005) to 40.0 percent (in FY 2009).
- Between FY 2010 and FY 2014 (ACA authorization extension period), additional RCHD swing bed payment over SNF PPS per hospital ranged from $740,000 (in FY 2011) to $930,000 (in FY 2014). The swing bed share of additional RCHD payments over IPPS per hospital ranged from 40.5 percent (in FY 2011) to 47.5 percent (in FY 2012) during this period.

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[87] The CCA authorization extension phase started in the year 2015 for hospitals that decided to continue in the demonstration from the MMA or ACA cohorts. New hospitals under the CCA authorization extension first joined in FY 2018, and those hospitals are not included in this analysis.

- Between FY 2015 and FY 2017 (CCA authorization extension for continuing hospitals) additional RCHD swing bed payment over SNF PPS per hospital ranged from $780,000 (in FY 2016) to $960,000 (in FY 2015). The swing bed share of additional RCHD payments over IPPS per hospital ranged from 35.2 percent (in FY 2017) to 53.8 percent (in FY 2016) during this period.

Exhibit 5.5: Average Additional RCHD Swing Bed Payments over SNF PPS & Swing Bed Share of Additional RCHD Payments over IPPS by Fiscal Year, FY 2005–2017
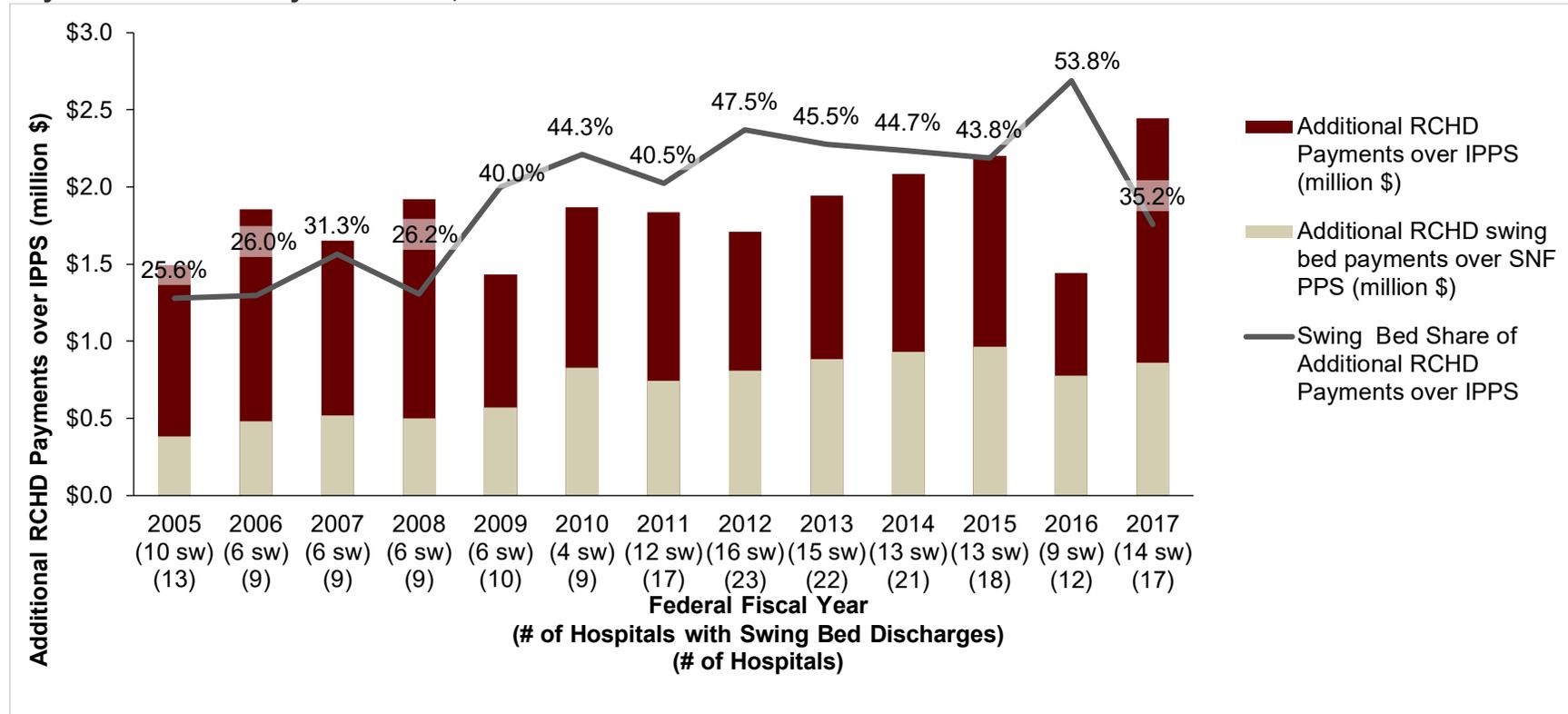
Notes: *(1) Numbers in parentheses in the top row with the "sw" abbreviation following the number show the number of RCHD hospital cost reports with swing bed discharges (swing bed hospitals) included in the calculations of additional RCHD swing bed reimbursement over SNF PPS (tan bars); numbers in parentheses in the bottom row without the "sw" abbreviation following the number show the number of RCHD hospital cost reports included in the calculations of additional RCHD payments over IPPS (red bars). In each fiscal year there was one cost report associated with each hospital. (2) Data from 189 settled cost reports were used for this analysis; 130 settled cost reports had non-zero swing bed discharges with information on the type of cost payment (actual or target). Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (3) The analysis includes at least one cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing.*

Source: *Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.*

There was large variation in the distribution of additional RCHD swing bed payments over SNF PPS across fiscal years. Within each fiscal year, there was variation in the additional RCHD swing bed payments over SNF PPS across participant hospitals. Exhibit 5.6 summarizes distributional information of the additional RCHD swing bed payments over SNF PPS per hospital between FY 2005 to FY 2017. The standard deviation in additional RCHD swing bed payment over SNF PPS ranged from $360,000 (in FY 2005) to $700,000 (in FY 2015 and FY 2017). In FY 2005, additional RCHD swing bed payment over SNF PPS among the 10 participating hospitals with swing bed discharges ranged from -$17,000 to $1.2 million. In FY 2015, additional RCHD swing bed payment over SNF PPS among the 13 participating hospitals with swing bed discharges ranged from -$11,000 to $2.5 million. In FY 2017, additional RCHD swing bed payment over SNF PPS among the 14 participating hospitals with swing bed discharges ranged from $41,000 to $2.2 million.

The 25th percentile of the additional RCHD swing bed payment over SNF PPS ranged from $120,000 (in FY 2008) to $640,000 (in FY 2013). The 50th percentile (median) of the additional RCHD swing bed payment over IPPS ranged from $290,000 (in FY 2005) to $920,000 (in FY 2014). The 75th percentile of the additional RCHD payments over IPPS ranged from $440,000 (in FY 2005) to $1.34 million (in FY 2015). Between FY 2005 and FY 2014, the median additional RCHD swing bed payment over SNF PPS increased from $290,000 in FY 2005 to $920,000 in FY 2014 and then declined between FY 2015 and FY 2017 to $680,000. Based on additional RCHD swing bed payment over SNF PPS at the 25th percentile and at the 75th percentile, the distribution broadened between FY 2005 and FY 2010, narrowed between FY 2011 and FY 2013, and then augmented again between FY 2014 to FY 2017. Some of this is likely due to changes in the composition of hospitals with swing bed discharges as well as external macro-economic conditions disproportionately impacting the volume of swing bed discharges in some hospital market areas.

The per-discharge additional RCHD swing bed payment over SNF PPS increased over time. On average, per-discharge additional RCHD swing bed payment over SNF PPS was highest during the first three years of the CCA authorization extension[88] and lowest during the MMA initial authorization period.

- Between FYs 2005 and 2009 (initial MMA authorization period), the per-discharge additional RCHD swing bed payment over SNF PPS ranged from $6,930 per hospital (in FY 2005) to $10,060 per hospital (in FY 2009).

- Between FYs 2010 and 2014 (ACA authorization extension period), the per-discharge additional RCHD swing bed payment over SNF PPS ranged from $7,220 per hospital (in FY 2011) to $11,050 (in FY 2010).

- Between FYs 2015 and 2017 (CCA authorization extension for continuing hospitals) the per-discharge additional RCHD swing bed payment over SNF PPS ranged from $10,100 (in FY 2015) to $12,810 (in FY 2017).

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[88] The CCA authorization extension phase started in the year 2015 for hospitals that decided to continue in the demonstration from the MMA or ACA cohorts. New hospitals under the CCA authorization extension first joined in FY 2018, and those hospitals are not included in this analysis.

Exhibit 5.6: Additional RCHD Swing Bed Payment over SNF PPS

Measure	Year 1 FY 2005	Year 2 FY 2006	Year 3 FY 2007	Year 4 FY 2008	Year 5 FY 2009	Year 6 FY 2010	Year 7 FY 2011	Year 8 FY 2012	Year 9 FY 2013	Year 10 FY 2014	Year 11 FY 2015	Year 12 FY 2016	Year 13 FY 2017
Average Additional RCHD Swing Bed Payment over SNF PPS (million $)	0.38	0.48	0.52	0.50	0.57	0.83	0.74	0.81	0.89	0.93	0.96	0.78	0.86
(Standard Deviation)	0.36	0.49	0.47	0.48	0.50	0.39	0.40	0.38	0.39	0.57	0.70	0.58	0.70
25th percentile: Additional RCHD Payments over IPPS Plus SNF PPS (million $)	0.22	0.17	0.17	0.12	0.26	0.54	0.47	0.63	0.64	0.40	0.42	0.38	0.21
50th percentile: Additional RCHD Payments over IPPS Plus SNF PPS (million $)	0.29	0.32	0.35	0.34	0.50	0.71	0.77	0.80	0.85	0.92	0.84	0.62	0.68
75th percentile: Additional RCHD Payments over IPPS Plus SNF PPS (million $)	0.44	0.69	0.80	0.79	0.73	1.11	1.01	1.04	1.05	1.13	1.34	0.87	1.29
Per-Discharge Average Additional RCHD Swing Bed Payments over SNF PPS (thousand $)	6.93	7.39	7.21	7.07	10.06	11.05	7.22	10.09	10.16	10.13	10.10	10.19	12.81
# of Demonstration Hospitals with Swing Bed Discharges	10	6	6	6	6	4	12	16	15	13	13	9	14
# of Hospitals	13	9	9	9	10	9	17	23	22	21	18	12	17

Notes: (1) Data from 130 settled cost reports were used for this analysis, as they had non-zero swing bed discharges with information on the type of cost payment (actual or target). Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least one cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) Appendix Exhibit E6 provides information on additional measures for RCHD payments over IPPS.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.

6 TOPIC AREA 3: IMPACT OF RCHD PAYMENTS ON HOSPITAL FINANCES

In this section, we analyze the impact of the RCHD on participant hospitals' financial condition, combining results from the quantitative analysis with insights from the interviews with hospital staff.[89] As mentioned previously, our results include only hospitals that were part of the MMA and ACA cohorts because the data for the CCA cohort were mostly preliminary as of the writing of this report. The results in Section 4 showed differences between RCHD participants and all eligible non-participants. In this section we present impacts of the RCHD, using a counterfactual approximating the likely experience of RCHD hospitals in the absence of the demonstration. To do this, the statistical analysis used a hospital comparison group similar to the RCHD hospitals on select measured characteristics. Therefore, results for Topic Area 3 (Impact) presented in this section may differ from those presented in Section 4, in which all eligible non-participant hospitals were compared against RCHD hospitals in the MMA or ACA cohorts. To isolate the impact of the RCHD on outcomes, the pre-post and DID regression analyses presented in this section control for hospital and FY fixed effects, and the contextual characteristics presented in Exhibit 3.2.

The methodology for the construction of the comparison groups used in this section is discussed in Section 3.1.2.4, and the results of the variables used, and tests of the comparison groups are discussed in Sections 6.3 and Section 6.9.2.[90]

Section 6.1 presents the key findings for the chapter. **Section 6.2** presents pre-post regression analyses of changes in outcomes changed before and after entering the demonstration for participating hospitals only. These regressions inform how outcomes evolved for participating hospitals in the demonstration but are not causal impacts because results may have been influenced by pre-existing trends. **Section 6.3** discusses the variables used in the entropy balancing algorithms used to construct the comparison group, and the baseline trends for the RCHD and comparison group. **Section 6.4** presents descriptive analyses of outcomes in the

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[89] The quantitative methodology for this section is discussed in Sections 3.1.2.3 and 3.1.2.4. Data sources for the regression outcomes, matching variables, and covariates are discussed in Section 2.

[90] The analyses in this section do not include hospitals that became CAHs in, or prior to, FY 2006, although descriptive analyses presented in Section 4 included these hospitals. Section 3.1.2.4 describes details of exclusion criteria used for the RCHD and comparison group.

baseline and demonstration periods for the RCHD and comparison hospitals to provide context for the impact estimates and to illustrate the differences between the balanced comparison group and all eligible non-participant hospitals. **Section 6.5** presents impact estimates for the demonstration overall using a weighted comparison group and DID regression model. **Sections 6.6** and **6.7** respectively, present DID impact analyses by cohort and market type (Competitive, Frontier, and Isolated). **Section 6.8** presents results for the Medicare swing bed revenue share outcome.

6.1 Key Findings

- Participation in the RCHD had large, positive, and statistically significant impacts on hospitals' Medicare inpatient and Medicare combined margins. Meaningful impacts on hospitals' total profit margins or operating margins were not detected. Total profit and operating margins are calculated from a large number of components across payers and sectors of the hospital and were only weakly correlated with Medicare inpatient margins.

- The RCHD was associated with higher capital investments via reductions in the average age of physical plant.

- Cohort-specific analyses show that there are impacts of the RCHD on Medicare inpatient margins, Medicare combined margins, and Medicare swing bed revenue share, for hospitals that joined during the MMA-authorized demonstration period and hospitals that joined during the ACA-authorized extension period. There was a larger impact of the RCHD on Medicare combined margins for the MMA cohort and a larger impact on average age of physical plant and Medicare swing bed revenue share for the ACA cohort.

- Participant hospitals in Frontier and Competitive areas benefited from the RCHD through higher Medicare revenue that increased inpatient and Medicare combined margins. Higher Medicare margins were not observed for hospitals in Isolated areas. However, the small (N = 5) number of Isolated market hospitals and their lower volumes made the analysis more susceptible to drastic variations. Also, additional results provide evidence that participating hospitals in Isolated markets received smaller RCHD payments than hospitals in Frontier and Competitive markets.

- Due to the RCHD payment methodology, it was advantageous to RCHD hospitals' finances to utilize Medicare swing beds whenever possible. Consistent with the design of the RCHD payment methodology, participating hospitals increased their share of Medicare inpatient revenues coming from swing beds.

- The results are robust to a variety of sensitivity checks, including using comparison hospitals from only non-eligible RCHD states and estimating statistical significance using randomization inference, which more accurately measures statistical significance with small sample sizes.

6.2 Pre-Post Analysis of RCHD Hospitals

In this section we discuss the results of the regression specification (equation [3]), described in Section 3.1.2.3, that we used to estimate the change in the financial condition of participant hospitals after they joined the RCHD, compared to their financial condition prior to participating. The purpose of this analysis is to directly assess how outcomes changed before and after hospitals participated in the demonstration. Section 6.4 provides descriptive statistics on the change in outcomes before and after RCHD participation, but in this section, we report estimates of the changes in outcomes for RCHD hospitals using regression to flexibly control for other characteristics that were shown to also have changed in Section 4. Additionally, the analysis in this section uses randomization inference to more accurately estimate statistical significance in the presence of the small number of RCHD hospitals.

The estimated effects of the demonstration discussed here do not have a causal interpretation because the regression specification does not include a comparison group. As a result, these results may have been influenced by common trends affecting the RCHD hospitals, including in hospital and contextual characteristics (for causal results, see the DID results in Section 6.5).

The pre-post regression results (Exhibits 6.1, 6.2, and 6.3) did not show a statistically significant association between RCHD participation and hospitals' financial margins,[91] nor with any of the other financial indicators examined, including days cash on hand, long-term debt-to-capitalization ratio, debt-service coverage ratio, ratio of salaries to net patient revenue, FTEs

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[91] Medicare inpatient margins were statistically significant at the 5% level with traditional inference methods but were not statistically significant at the 10% level (p=0.16) with randomization inference.

per occupied bed, and average age of physical plant. In terms of the Medicare revenue indicators, only one outcome—Medicare swing bed revenue share—had a statistically significant association with RCHD participation. The results show that the RCHD is associated with a 4.88 percentage point increase, relative to a baseline mean of 5.94 percent, or an 82 percent increase in Medicare swing bed revenue share. This result is present when using either traditional or randomization inference.

As discussed in Section 4, there are many other factors besides RCHD payments associated with hospital performance that were changing during this period. To disentangle the effect of other characteristics from the effect of the RCHD, a similar comparison group of non-participating hospitals is needed to control for these external factors. The analysis with these similar comparison groups is provided in the following sections.

Exhibit 6.1: Pre-Post Results for Financial Margins, All Cohorts and Hospitals, All Market Typologies

	Total Profit Margin	Operating Margin	Medicare Inpatient Margin	Medicare Combined Margin
Average Pre-Post Estimate	-1.70	-2.61	11.35**	4.46
90% Confidence Interval	(-5.40, 1.99)	(-8.81, 3.59)	(4.52, 18.18)	(-1.21, 10.14)
Standard Error	(2.24)	(3.76)	(4.15)	(4.15)
Regression *p*-value	[0.45]	[0.49]	[0.01]	[0.21]
Randomization Inference *p*-value	[0.79]	[0.77]	[0.16]	[0.73]
Baseline Mean for RCHD Hospitals	3.73	0.34	-15.53	-16.33
Average Pre-Post Estimate as a Percentage of the RCHD Group Baseline Mean	-46%	-768%	73%	27%
Sample Size (Hospital-Years)	312	312	312	312
Number of Hospitals	29	29	29	29

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are shown in parentheses. *** Indicates statistical significance at the 1% level, ** at the 5% level, * at the 10% level, using traditional inference. None of the coefficient estimates in this table are statistically significant at the 10% level using randomization inference. The comparison group was defined using an entropy balancing method. The sample size of 312 differs from the sample size of the results reported in Exhibit 5.10 of 185 for two reasons: (1) the Topic Area 2 regression analyses do not use baseline data (i.e., the three years prior to the beginning of each cohort) and (2) Topic Area 2 regression analyses use cost report data, which have more missing data than HCRIS data.

Exhibit 6.2: Pre-Post Results for Other Financial Outcomes, All Cohorts and Hospitals, All Market Typologies

	Days Cash on Hand	Long-Term Debt to Capitalization Ratio	Ratio of Salaries to Net Patient Revenue	Full Time Equivalents per Occupied Bed	Average Age of Physical Plant
Average Pre-Post Estimate	-1.39	2.97	0.56	2.18	-2.59
90% Confidence Interval	(-17.52, 14.74)	(-5.11, 11.06)	(-2.68, 3.80)	(-2.29, 6.65)	(-5.47, 0.29)
Standard Error	(9.79)	(4.91)	(1.97)	(2.71)	(1.75)
Regression *p*-value	[0.89]	[0.55]	[0.78]	[0.43]	[0.15]
Randomization Inference *p*-value	[0.39]	[1.00]	[0.77]	[0.47]	[0.27]
Baseline Mean for RCHD Hospitals	105.16	26.31	44.33	7.67	16.11
Average Pre-Post Estimate as a Percentage of the RCHD Group Baseline Mean	-1%	11%	1%	28%	-16%
Sample Size (Hospital-Years)	312	312	312	311	302
Number of Hospitals	29	29	29	29	29

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. None of the coefficient estimates in this table are statistically significant at the 10% level using traditional or randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit 6.3: Pre-Post Results for Medicare revenue indicators, All Cohorts and Hospitals, All Market Typologies			
	Medicare Share of Inpatient Discharges	Medicare Share of Inpatient Days	Medicare Swing Bed Revenue Share
Average Pre-Post Estimate	-0.22	-0.55	4.88*^^^
90% Confidence Interval	(-1.52, 1.07)	(-2.04, 0.94)	(0.76, 9.00)
Standard Error	(0.79)	(0.01)	(2.50)
Regression *p*-value	[0.78]	[0.55]	[0.06]
Randomization Inference *p*-value	[0.58]	[0.60]	[0.00]
Baseline Mean for RCHD Hospitals	45.93	60.45	5.94
Average Pre-Post Estimate as a Percentage of the RCHD Group Baseline Mean	-0%	-1%	82%
Sample Size (Hospital-Years)	312	312	312
Number of Hospitals	29	29	29

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

6.3 Comparison Group Selection

We implemented an entropy balancing algorithm to find separate comparison groups for each hospital cohort (e.g., hospitals that joined the RCHD in the MMA-authorized demonstration period) and for each subgroup analyzed (e.g., hospitals in Frontier market areas). The matching variables used for the construction of each comparison group are given in Appendix Exhibit G1. The following matching variables were used to construct comparison groups for both the MMA and ACA cohorts: baseline levels of Medicare inpatient margins and total profit margins, market category, county-level poverty incidence, county-level percentage of population over 65 years of age, county racial composition, county unemployment rate, and a state Medicaid expansion indicator. The MMA cohort comparison group also used additional matching variables, which are listed in Appendix Exhibit G1.

The importance of including these variables in the matching algorithm is reflected in the Topic Area 1 (Attributes) analysis, which investigated how these variables differed between RCHD hospitals and similar non-participant hospitals at baseline. The analysis of hospital margins and other contextual/organizational characteristics examined under Topic Area 1 (Attributes) established that several of these variables (hospital margins, county poverty and unemployment rate, county racial composition, state Medicaid expansion status, and organizational characteristics such as for-profit status) were statistically significantly different between the two groups at baseline. Large differences in the levels or means of baseline outcomes imply that the baseline outcome trends between the two groups are also likely to differ. Similarly, differences in hospitals' contextual and organizational characteristics correlate with differences in the financial performance trajectories for hospitals. Not accounting for these differences would lead to biased impact estimates. For example, the graph of "unbalanced" Medicare inpatient margins in Appendix Exhibit G3 shows that Medicare inpatient margins in the RCHD group had an increasing trend at baseline relative to the comparison group. If weighting or matching had not been used to alter the composition of the non-participant group, we would have overestimated the RCHD's impact.

In Appendix Exhibit G2 we also report balancing statistics on the matching variables used in the entropy balancing algorithm. In all cases, the magnitudes of the post-balancing standardized differences are well below the 10 percent threshold, indicating that the entropy balancing algorithm was successful in balancing the means of these variables between the RCHD and comparison groups.

We also conducted a test of parallel baseline trends to assess the identifying assumption of the DID model. Those results are discussed in Section 6.9.2.

6.4 Descriptive Analysis of the RCHD's Impact

We used a descriptive approach to set the stage for interpreting the results of the DID regression analyses (Section 6.5). To do this, we calculated mean financial outcomes for participant and comparison hospitals for the baseline and demonstration periods using bivariate *t*-tests. This analysis is comparable to the Topic Area 1 (Attributes) analysis described in Section 4.2.3, where we examined the difference in means for hospital margins and other financial indicators between RCHD hospitals and eligible non-participants during the baseline and demonstration periods. We present descriptive results for Topic Area 3 (Impact) to provide context for the DID analyses. Unlike Section 4, the descriptive results in this section use an entropy-balanced comparison group instead of all eligible non-participant hospitals and apply additional restrictions to RCHD and comparison hospitals. Therefore, the reported means for RCHD hospitals across Topic Area 1 (Attributes) and 3 (Impact) descriptive analyses are very similar,[92] while the means for the comparison group are in general not similar.

Hospital margins. Exhibit 6.4 shows that for RCHD hospitals, Medicare inpatient margins increased by 15 percentage points between the baseline and demonstration period (from –15.53 percent to -0.32 percent), and Medicare combined margins increased by 6 percentage points (from –16.33 percent to –10.31 percent). In contrast, there were no statistically significant changes in total profit margins (which include all payers and investment income) and operating margins between the baseline and demonstration periods for RCHD participants. All four margins saw no statistically significant change for comparison hospitals during the same time period.

By comparison, the Topic Area 1 (Attributes) analyses in Section 4 used all eligible non-participant hospitals instead of an entropy-balanced comparison group. Those analyses found that at baseline, total profit margins and Medicare inpatient margins differed substantially between RCHD and all eligible non-participant hospitals, highlighting the need for a more similar comparison group. In contrast, the comparison group used for the Topic Area 3 (Impact)

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[92] The small differences observed are on account of fewer RCHD and comparison hospitals being included, and a slightly different baseline period for the ACA cohort, in the Topic Area 3 analysis (see Section 3.1.2.4).

analyses had nearly identical total profit margins and Medicare inpatient margins at baseline. The results show that using either the reference group of all non-participants (Topic Area 1, presented in Section 4) or the entropy-balanced comparison group (Topic Area 3, presented in Section 6), the comparison group did not have a substantial change in total profit margins or Medicare inpatient margins, and RCHD hospitals did not have a substantial change in total profit margins but did have a large increase in their Medicare inpatient margins.

Exhibit 6.4: RCHD and Comparison Hospital Financial Margins		
	RCHD Hospitals	**Comparison Hospitals**
Total Profit Margin		
Baseline Period Mean	3.73%	3.73%
Demonstration Period Mean	2.04%	4.35%
Difference	-1.68	0.62
Operating Margin		
Baseline Period Mean	0.34%	-2.22%
Demonstration Period Mean	-1.07%	-2.74%
Difference	-1.42	-0.52
Medicare Inpatient Margin		
Baseline Period Mean	-15.53%	-15.52%
Demonstration Period Mean	-0.32%	-12.40%
Difference	15.20***	3.12
Medicare Combined Margin		
Baseline Period Mean	-16.33%	-13.27%
Demonstration Period Mean	-10.31%	-16.52%
Difference	6.02***	-3.25
Number of Hospitals	**29**	**511**
Sample Size (Hospital-Years)	**312**	**8,699**

Notes: The maximum sample sizes for the set of outcomes in the table are reported; sample sizes may be slightly smaller for some outcomes due to missing data in some years. *** Indicates statistical significance at the 1% level, ** at the 5% level, * at the 10% level, using traditional inference.

Other financial indicators. The results for other financial indicators are included in Appendix Exhibit G5. These results show that, for the outcomes with a statistically significant change between the baseline and demonstration periods for one or both groups, there was:

- A statistically significant decrease in the average age of physical plant (by 3.64 years) for RCHD hospitals, whereas the average age of physical plant remained unchanged for the comparison hospitals. This implies that RCHD hospitals made capital investments that comparison hospitals did not.

- A statistically significant increase of 1.42 FTEs per occupied bed for RCHD hospitals; but there was no change in the number of FTEs per occupied bed for comparison hospitals.

There were no statistically significant changes (at the 10 percent significance level) in the following outcomes between the baseline and demonstration periods for both the RCHD and comparison hospitals: days cash on hand, long-term debt-to-capitalization ratio, and salaries to net patient revenue.

Medicare revenue indicators. The results for Medicare revenue financial indicators are included in Appendix Exhibit G5. These results show that there was:

- A statistically significant, 2.72 percentage point decline in Medicare share of inpatient discharges for RCHD hospitals and a 1.49 percentage point decline for comparison hospitals, which is a 6 percent and 4 percent change, respectively, relative to their baseline means.

- A statistically significant, 4.00 percentage point decline in Medicare share of inpatient discharges for RCHD hospitals and a 2.44 percentage point decline for comparison hospitals, which is a 7 percent and 5 percent change, respectively, relative to their baseline means.

- A statistically significant, 5.60 percentage point increase in Medicare swing bed revenue share for RCHD hospitals, and a 0.65 percentage point decline for comparison hospitals, which is a 94 percent and 34 percent change, respectively, relative to their baseline means.

6.5 Impact of the RCHD Payments on the Financial Condition of Participant Hospitals

In this section we discuss the results obtained when we estimated the DID model described in Section 3.1.2.4, using an entropy-balanced comparison group. We find that the DID estimates for Medicare margin outcomes are larger than the pre-post estimates, and this conclusion is supported by both traditional and randomization inference techniques. This difference in results indicates that the comparison group hospitals fared worse than the RCHD hospitals during the demonstration period and implies that participant hospitals would have fared much worse if they had not been supported by RCHD payments.

This conclusion is consistent with the qualitative evidence collected. Most hospitals emphasized the importance of the RCHD payments in supporting their financial viability and service lines. In general, hospitals reported having thin margins and being either in a break-even or close to break-even status. As one hospital reported, "In some years, the demo dollars have been our margin." Numerous hospitals emphasized that even if their margins were very thin or negative, the RCHD payments prevented their financial performance from being even worse; as one mentioned, "We still lost money, but obviously, the red ink would have been a lot more without this higher payment on the inpatients." The increased revenue from the RCHD, according to these reports, has made a difference in participant hospitals' ability to remain open or to ensure the operation of satellite facilities.

Hospital margins. The DID results (Exhibit 6.5) show that hospitals that participated in the RCHD increased their Medicare inpatient margins by 13.71 percentage points relative to the comparison group, from a baseline mean of −15.53 percent, or an 88 percent increase (regression and randomization inference *p*-values statistically significant at the 1 percent level).

Medicare combined margins also increased as a result of the RCHD, but by a smaller percentage than Medicare inpatient margins: 8.81 percentage points from a baseline mean of −16.33 percent, or by 54 percent (regression and randomization inference *p*-value statistically significant at the 1 percent level). The size of the impact of the RCHD on Medicare combined margins is about 64 percent of the size of the impact on Medicare inpatient margins ([8.81/13.71]*100). Since Medicare inpatient revenues represent about 68 percent of Medicare revenues, these results do not appear to suggest spillover effects from the RCHD (which is targeted at acute and swing bed services) to outpatient services.

However, the RCHD did not have a statistically significant impact on participating hospitals' operating margins or total profit margins (which include all payers and investment income). This result aligns with the information collected during the interviews. While hospitals emphasized the importance of the RCHD in supporting their viability, they highlighted that significant challenges remain: "Well, [the RCHD has] made a difference. It hasn't been the sole thing that's going to turn the ship around." In most cases, the RCHD payments remain important to support overall viability, but hospitals spoke about the necessity of controlling costs and responding to the "headwinds" posed by declining reimbursement and other financial challenges.

> *"Every inch of improvement we got from the demonstration project allowed us to invest in the things we invested in in 2019. So we didn't really have any extra money at the end of the year, but we did have some new things . . . that we believe have been beneficial to the health of our service area."*
>
> *- Hospital Leadership*

Other financial indicators. The DID results provide some evidence that participant hospitals were able to invest in fixed assets like buildings and equipment as a result of the RCHD. This effect, while large, was measured somewhat imprecisely for the full sample. We found that the RCHD payments were associated with a reduction in hospitals' average age of physical plant by 18 percent (a decrease of 2.91 years from a baseline mean of 16 years, as seen in Exhibit 6.6; the *p*-value is statistically significant at the 10 percent level, and the randomization inference *p*-value is marginally insignificant at the 10 percent level).[93]

The decrease in hospitals' average age of physical plant may be one factor that helps explain why the results show a positive impact of the RCHD on hospitals' Medicare margins but not their total profit margins. New buildings and equipment purchased as a result of the RCHD payments are added as a depreciation expense to the overall operating statement, which reduces hospitals' total profit margins. Although the depreciation expense would have had some effect on Medicare margins as well, it would not be as strong as the effect on total profit margins. The reason is that the new investment in buildings/equipment would not be fully allocated just to Medicare but would be spread throughout all payer classes and the overall organization.

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[93] The randomization inference p-value is 0.109631.

We did not find evidence that the RCHD had an impact on the other financial indicators we examined, including days cash on hand, long-term debt-to-capitalization ratio, debt-service coverage ratio, FTEs per occupied bed, and ratio of salaries to net patient revenue.

Medicare revenue indicators. The results also show (Exhibit 6.7) that RCHD participation increased hospitals' share of Medicare swing bed revenue by 5.34 percentage points, relative to a baseline mean of 5.94, or 90 percent. The interpretation of this result and comparisons of the results to descriptive statistics and other models is presented in Section 6.8. By contrast, we did not find evidence that the RCHD had an impact on Medicare share of inpatient discharges and Medicare share of inpatient days.

These findings are consistent with the evidence that participant hospitals invested their RCHD funds in diverse initiatives. The majority of hospitals reported that the RCHD payments supported overall operations and were not earmarked for specific initiatives or services. Funds from the RCHD helped hospitals remain open or maintain specific service lines even if no difference was found on overall financial stability and profitability. One hospital, which offers a wide range of specialty services, reported that the RCHD payments supported growth of new service lines and high quality of care, which allowed the hospital to recruit more physicians and specialists to further enhance its offerings. Another credited the RCHD payments with its survival and reported that it would have "definitely" closed the intensive care unit without RCHD funds. Other hospitals emphasized that the RCHD complemented service expansion and financial sustainability efforts and that certain initiatives "wouldn't have been possible" without that additional financial support. Hospital staff spoke about the importance of the RCHD funds in maintaining crucial services locally to serve high-need populations. In some cases, the demonstration has resulted in RCHD hospitals becoming the only regional provider of particular services. For example, a hospital reported that many CAHs in the surrounding community have dropped obstetric services and that it has become a critical regional provider to women with no other access to such services. This hospital and one other hospital indicated that the RCHD has been particularly important for supporting mental health services, which tend to be less profitable but are vital to the community. Similarly, a representative from another hospital spoke about the importance of maintaining local dialysis services, which come close to breaking even, because "no one else up here would take the risk to run one of those."

Exhibit 6.5: Difference-in-Differences Results: Financial Margins, All Cohorts and Hospitals of All Market Typologies

	Total Profit Margin	Operating Margin	Medicare Inpatient Margin	Medicare Combined Margin
Average Impact Estimate	-0.79	-0.24	13.71***^^^	8.81***^^^
90% Confidence Interval	(-3.34, 1.75)	(-3.98, 3.51)	(8.64, 18.77)	(4.71, 12.91)
Standard Error	(0.02)	(2.27)	(3.07)	(2.49)
Regression *p*-value	[0.61]	[0.91]	[0.00]	[0.00]
Randomization Inference *p*-value	[0.65]	[0.93]	[0.00]	[0.00]
Baseline Mean for RCHD Hospitals	3.73	0.34	-15.53	-16.33
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-21%	-71%	88%	54%
Sample Size (Hospital-Years)	8,984	8,984	8,995	9,003
Number of RCHD Hospitals	29	29	29	29
Number of Comparison Hospitals	511	511	511	511

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit 6.6: Difference-in-Differences Results: Other Financial Outcomes, All Cohorts and Hospitals of All Market Typologies

	Days Cash on Hand	Long-Term Debt-to-Capitalization Ratio	Ratio of Salaries to Net Patient Revenue	Full-Time Equivalents per Occupied Bed	Average Age of Physical Plant
Average Impact Estimate	-2.88	-0.48	-0.63	1.33	-2.91*
90% Confidence Interval	(-21.53, 15.78)	(-9.27, 8.30)	(-3.23, 1.96)	(-1.60, 4.26)	(-5.74, -0.07)
Standard Error	(11.32)	(5.33)	(1.58)	(1.78)	(1.72)
Regression *p*-value	[0.80]	[0.93]	[0.69]	[0.45]	[0.09]
Randomization Inference *p*-value	[0.86]	[0.98]	[0.72]	[0.51]	[0.11]
Baseline Mean for RCHD Hospitals	105.16	26.31	44.33	7.67	16.11
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-3%	-2%	-1%	17	-18%
Sample Size (Hospital-Years)	9,004	8,961	8,983	8,949	8,103
Number of RCHD Hospitals	29	29	29	29	29
Number of Comparison Hospitals	511	511	511	511	499

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. None of the coefficient estimates in this table are statistically significant at the 10% level using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit 6.7: Difference-in-Differences Results: Medicare revenue indicators, All Cohorts and Hospitals of All Market Typologies

	Medicare Share of Inpatient Discharges	Medicare Share of Inpatient Days	Medicare Swing Bed Revenue Share
Average Impact Estimate	-0.68	-0.78	5.34***^^^
90% Confidence Interval	(-1.52, 0.17)	(-2.10, 0.54)	(2.81, 7.87)
Standard Error	(0.51)	(0.80)	(1.54)
Regression *p*-value	[0.19]	[0.33]	[0.00]
Randomization Inference *p*-value	[0.44]	[0.49]	[0.00]
Baseline Mean for RCHD Hospitals	45.93	60.45	5.94
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-1%	-1%	90%
Sample Size (Hospital-Years)	8,997	8,998	8,997
Number of RCHD Hospitals	29	29	29
Number of Comparison Hospitals	511	511	511

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference.

6.6 Variation in Impact by Cohort

We also explored whether the RCHD had a different effect on hospitals that joined the RCHD under different authorizations (MMA and ACA cohorts). Section 1.4 discusses the motivation and hypotheses for this subgroup analysis, and Section 3.1.2.4 discusses the methodology.

The results, reported in Appendix Exhibits G8–G10 (MMA cohort) and Appendix Exhibits G11–G13 (ACA cohort), show that the RCHD did not have a clear differential impact between the MMA and ACA cohorts. Both cohorts increased Medicare inpatient and combined margins (although the increase for Medicare combined margins was substantially larger for the MMA cohort) and Medicare swing bed revenue share. Additionally, average age of physical plant decreased only for the ACA cohort hospitals.

Medicare inpatient margins. The RCHD increased Medicare inpatient margins for both the MMA and ACA cohorts, and the increases were relatively similar in magnitude. For the MMA cohort, the RCHD increased Medicare inpatient margins by 20.46 percentage points, from a baseline mean of –17.64 percent, or by 116 percent (regression and randomization inference *p*-values statistically significant at the 1 percent level). For hospitals in the ACA cohort, RCHD participation increased their Medicare inpatient margins by 17.34 percentage points, from a baseline mean of –13.81 percent, or by 126 percent (regression and randomization inference *p*-values statistically significant at the 1 percent level).

Medicare combined margins. The RCHD increased Medicare combined margins for both the MMA and ACA cohorts, although the magnitude was about twice as large for the MMA cohort, relative to the RCHD hospitals' baseline mean. For hospitals in the MMA cohort, Medicare combined margins increased by 17.38 percentage points, from a baseline mean of –15.81 percent, or by 110 percent (regression and randomization inference *p*-values statistically significant at the 1 percent level). For hospitals in the ACA cohort, Medicare combined margins increased by 9.67 percentage points, from a baseline mean of –16.75 percent, or by 58 percent (statistically significant at the 1 percent level with traditional inference and 5 percent level with randomization inference).

Total profit margins and operating margins. We did not find evidence of an impact of the RHCD on total profit margins or operating margins for either cohort.

Average age of physical plant. There was no impact of the RCHD on the average age of physical plant for hospitals in the MMA cohort, but there was a significant decrease for hospitals

in the ACA cohort. Specifically, for hospitals in the ACA cohort, the RCHD was associated with a reduction in their average age of physical plant by 5.11 years, relative to a baseline mean of 19 years, or by 27 percent (regression and randomization inference *p*-values statistically significant at the 5 percent level).

Medicare swing bed revenue share. The RCHD increased Medicare swing bed revenue share for both the MMA and ACA cohorts, although the magnitude was about twice as large for the ACA cohort, relative to the RCHD hospitals' baseline mean. For hospitals in the MMA cohort, the RCHD increased Medicare swing bed revenue share by 3.73 percentage points, from a baseline mean of 7.07 percent, or 53 percent (statistically significant at the 10 percent level with traditional inference and 1 percent level with randomization inference). For hospitals in the ACA cohort, the RCHD increased Medicare swing bed revenue share by 6.32 percentage points, from a baseline mean of 5.02 percent, or 126 percent (regression and randomization inference *p*-values statistically significant at the 1 percent level).

We did not find any impacts of the RCHD on the other financial indicators examined.[94]

6.7 Variation in Impact by Market Factors

In this section, we discuss the impact of demonstration participation by market category, where we look at demonstration impacts separately for hospitals in Competitive, Frontier, and Isolated market areas. Competitive hospitals are those that have three or more hospitals within 35 miles; Frontier hospitals are located in non-competitive market areas (fewer than three hospitals within 35 miles) but are in areas of stable or growing populations; and isolated hospitals have fewer than three hospitals within 35 miles and are in areas experiencing population decline.

Section 1.4 discusses the motivation and hypotheses for this subgroup analysis, and Section 3.1.2.4 discusses the methodology.

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[94] For hospitals in the MMA cohort, the estimates of the impacts of the RCHD on Medicare share of inpatient discharges and long-term debt-to-capitalization ratio were statistically significant at the 5 percent level with traditional inference but were not significant at the 10 percent level with randomization inference. For hospitals in the ACA cohort, the estimate of the impact of the RCHD on ratio of salaries to net patient revenue was statistically significant at the 5 percent level with traditional inference but was not significant at the 10 percent level with randomization inference.

The results, reported in Appendix Exhibits G14–G16 (Competitive), Appendix Exhibits G17–G19 (Frontier), and Appendix Exhibits G20–G22 (Isolated) show that, similar to the full sample, hospitals in Competitive and Frontier areas had improved Medicare margins as a result of demonstration participation. However, our results do not show that the Medicare margins of hospitals in Isolated areas benefited from demonstration participation. The results for Isolated hospitals may not be fully reliable as there are very few RCHD hospitals in the isolated category (N = 5). This small sample size means that the results are more susceptible to noise resulting from random fluctuations in the data and that the number of variables that can be used in the entropy balancing algorithm is limited. Although we do not consider the results for Isolated hospitals reliable, the result that Medicare inpatient and combined margins improve for Competitive and Frontier hospitals, but not Isolated hospitals, is consistent with the regression results reported in Section 5 that show that the size of the RCHD payments received by hospitals in Isolated markets were substantially smaller than the RCHD payments received by hospitals in Competitive and Frontier markets.

Medicare inpatient margins. The RCHD increased Medicare inpatient margins for hospitals in both Competitive and Frontier markets, and the increases were relatively similar in magnitude. There was no evidence of an increase in Medicare inpatient margins for hospitals in Isolated markets, but as noted above, we do not consider the evidence for Isolated hospitals reliable due to the very small number of RCHD hospitals in this market category. For hospitals in Competitive markets, the RCHD increased Medicare inpatient margins by 15.90 percentage points, from a baseline mean of –15.10 percent, or by 105 percent (regression and randomization inference *p*-values statistically significant at the 1 percent level). For hospitals in Frontier markets, RCHD participation increased their Medicare inpatient margins by 21.18 percentage points, from a baseline mean of –21.51 percent, or by 98 percent (regression *p*-value statistically significant at the 1 percent level and randomization inference *p*-value statistically significant at the 5 percent level).

Medicare combined margins. The RCHD increased Medicare combined margins for hospitals in both Competitive and Frontier markets, and the increases were relatively similar in magnitude. There was no evidence of an increase in Medicare combined margins for hospitals in Isolated markets, but as noted above, we do not consider the evidence for Isolated hospitals reliable due to the very small number of RCHD hospitals in this market category. For hospitals in Competitive markets, the RCHD increased Medicare combined margins by 7.18 percentage points, from a baseline mean of -16.50 percent, or by 44 percent (regression *p*-value statistically

significant at the 5 percent level and randomization inference *p*-value statistically significant at the 10 percent level). For hospitals in Frontier markets, RCHD participation increased their Medicare combined margins by 14.20 percentage points, from a baseline mean of –20.61 percent, or by 69 percent (regression *p*-value statistically significant at the 1 percent level and randomization inference *p*-value statistically significant at the 5 percent level).

Total profit margins and operating margins. We did not find evidence of an impact of the RHCD on total profit margins or operating margins for hospitals in any market category.

Days cash on hand. The results show that the RCHD decreased days cash on hand only for hospitals in Isolated markets, but we do not consider this result reliable.

Medicare swing bed revenue share. The RCHD increased Medicare swing bed revenue share for hospitals in both Competitive and Frontier markets, although the magnitude was about five times as large for hospitals in Frontier markets, relative to the RCHD hospitals' baseline mean. There was no evidence of an increase in Medicare swing bed revenue share for hospitals in Isolated markets, but as noted above, we do not consider the evidence for Isolated hospitals reliable due to the very small number of RCHD hospitals in this market category. For hospitals in Competitive markets, the RCHD increased Medicare swing bed revenue share by 6.07 percentage points, from a baseline mean of 7.77 percent, or by 78 percent (regression and randomization inference *p*-values statistically significant at the 1 percent level). For hospitals in Frontier markets, RCHD participation increased their Medicare swing bed revenue share by 2.04 percentage points, from a baseline mean of 0.45 percent, or by 454 percent (regression *p*-value not statistically significant at the 10 percent level [p = 0.10] and randomization inference *p*-value statistically significant at the 5 percent level).

We did not find any impacts of the RCHD on the other financial indicators examined.[95]

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[95] For hospitals in competitive markets, the estimate of the impact of the RCHD on average age of physical plant was statistically significant at the 10% level with traditional inference but was not significant at the 10% level with randomization inference [p=0.16].

6.8 Importance of Swing Bed Reimbursement under the RCHD

Many hospital staff described the importance of swing beds in enhancing their hospitals' RCHD payments. Two hospitals indicated that "the swing bed portion of this [program] makes it work for us" or that swing beds were "an important component of the reimbursement." One health care system operating multiple hospitals reported that one hospital with swing beds stayed in the RCHD and the other without swing beds ultimately withdrew. Another hospital attributed its fluctuations in RCHD payments to fluctuation in swing bed utilization, demonstrating the significant impact of swing beds on overall RCHD funding.

As explained in Section 1.1.2 and Appendix A, substituting Medicare acute care beds for Medicare swing beds would improve a hospital's Medicare inpatient margins. Therefore, it is of particular interest to analyze whether the RCHD has changed the share of Medicare swing bed revenue. These results are presented along with all other outcomes and discussed above, but that discussion is summarized here.

Previous studies have shown that swing beds tend to provide benefits for both patients and providers for several reasons. First, patients reported feeling more comfortable being treated in hospital swing beds than in a SNF because being in a hospital made them feel more cared for. Providers also reported preferring swing beds because they could visit their patients more frequently.[96,97] Second, especially in rural settings, adequate SNF facilities are often missing, so swing beds are in some cases the only long-term care option for patients. Therefore, swing beds provide a necessary service to rural communities by providing a long-term care option that is either of higher quality than the alternative or the only possible option for long-term care. Additionally, swing beds provide more time for families of patients to make arrangements for future care or plans for palliative care without having to move the patient out of the community.[98]

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[96] Freeman, V. A., & Radford, A. (2012, April). *Why use swing beds? Conversations with hospital administrators and staff* [Findings brief]. North Carolina Rural Health Research & Policy Analysis Center. https://www.shepscenter.unc.edu/wp-content/uploads/2014/04/FB105.pdf

[97] Azalea Health. (n.d.). *Medicare swing beds: A vital service for rural communities.* https://www.azaleahealth.com/blog/medicare-swing-beds-a-vital-service-for-rural-communities

[98] Parrish, J., Turner, A., & Woeppel, M. (2016). *Impact of swing beds* [Policy paper]. National Rural Health Association. https://www.ruralhealthweb.org/getattachment/Advocate/Policy-Documents/NRHAImpactofSwingBedsPolicyPaperFeb2016-(1).pdf.aspx?lang=en-US

Finally, several studies have found that swing bed patients were discharged more quickly and frequently than SNF patients after adjusting for case-mix differences.[99]

T-test results, reported in Appendix Exhibit G5, show that for RCHD hospitals, the swing bed share of Medicare inpatient revenues was 5.94 percentage points at baseline and increased to 11.54 percentage points during the demonstration period. Comparison hospitals, on the other hand, saw a relatively small decline (to 1.29 percent from a baseline of 1.94 percent) in their swing bed revenue share. The differences between baseline and demonstration periods for both RCHD hospitals and the comparison hospitals were statistically significant.

Consistent with the information obtained from the interviews and the descriptive statistical analysis, the DID results indicate that the RCHD hospitals saw a larger share of their Medicare inpatient reimbursements coming from swing beds. For the full sample (see Exhibit 6.5, above), swing bed share increased by 5.34 percentage points, from a baseline mean of 5.94 percent, or a 90 percent increase. This effect was evident for hospitals in the MMA cohort and in the ACA cohort. However, the impact was substantially larger for the ACA cohort than for the MMA cohort (126 percent increase vs. 53 percent increase), indicating that hospitals participating in a later round may have observed and learned from hospitals' experience in the previous round. Additionally, as shown in Exhibit 5.6, average per-discharge additional RCHD swing bed payments over SNF PPS was higher in the ACA-authorized extension period than in the MMA-authorized demonstration period, which suggests that it may have been more profitable for ACA cohort hospitals to increase their Medicare swing bed revenue share than MMA cohort hospitals. Hospitals in Competitive and Frontier areas increased their Medicare swing bed revenue share (by 78 percent and 454 percent,[100] respectively), but hospitals in Isolated areas did not increase their Medicare swing bed revenue share as a result of RCHD participation.

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[99] Shaughnessy, P. W., Schlenker, R. E., & Silverman, H. A. (1988). Evaluation of the national swing-bed program in rural hospitals. *Health Care Financing Review, 10*(1), 87–94. https://www.cms.gov/research-statistics-data-and-systems/research/healthcarefinancingreview/downloads/cms1191012dl.pdf

[100] The high percentage increase in this case is accounted for by a very low (close to 0) baseline mean value.

6.9 Sensitivity Checks

In this section, we describe the sensitivity checks we performed for the regression analyses reported in this section. We describe the following sensitivity checks: using only hospitals in non-eligible states to form the comparison group, the baseline parallel trends test, and randomization inference. The results for the first sensitivity check are reported in Exhibit 6.8 below and in Appendix Exhibits G6 and G7, and the results for the second are reported in Appendix Exhibit G4. Randomization inference results are reported in all pre-post and DID regression analysis tables and discussed throughout Sections 6.2–6.8.

6.9.1 Using Only Hospitals in Non-Eligible States as Comparison Group

As explained in Section 1.1, hospitals from only the 10 least densely populated states during the MMA-authorized demonstration period and 20 least densely populated states during the ACA-authorized extension period were eligible to participate in the RCHD. In all analyses in this report, we compare to eligible non-participant hospitals (unweighted in Topic Area 1 and weighted in Topic Area 3 (Impact)) from all 50 states. However, we are interested in whether the full sample results are robust to using comparison hospitals only from states that were not eligible to participate in the RCHD in the MMA and ACA rounds. While using only non-eligible states limited the size of the comparison pool, it has several advantages over drawing comparison hospitals from a mix of eligible and non-eligible states. Drawing some comparison hospitals from RCHD-eligible states may bias the impact estimate results in several ways. First, RCHD participation may have spillover effects—the financial performance of RCHD hospitals may influence the margins of other hospitals in the same area. If these other hospitals are included as controls, they could bias the impact estimate results. For example, impact estimates would be biased upward if RCHD hospitals do better as a result of the demonstration and other, nearby non-participant hospitals do worse. Second, if we had included hospitals from eligible states, we would have been more likely to include as controls hospitals that did not apply for the RCHD but were eligible, and hospitals that applied, but were not selected. Since we do not fully know why certain hospitals applied or were selected, this might have introduced some selection bias. The results of this check are shown in Panel B in Exhibit 6.8 and Appendix Exhibits G6 and G7.

Hospital margins. Exhibit 6.8 reports the results from the main DID specification and this sensitivity check for the hospital margins outcomes. Impacts were consistent across both specifications; Medicare inpatient and Medicare combined margins increased as a result of RCHD participation, and total profit margins and operating margins did not change. For both Medicare inpatient and Medicare combined margins, the main specification point estimates that drew comparison hospitals from all states were somewhat higher than when the comparison group was drawn only from non-eligible states. In the main specification, Medicare inpatient margins increased by 14 percentage points, and Medicare combined margins increased by 9 percentage points. In the non-eligible states comparison group, Medicare inpatient margins increased by 11 percentage points and Medicare combined margins increased by 8 percentage points. Although the magnitudes differed somewhat, the point estimates for Medicare inpatient and Medicare combined margins were large and statistically significant in both specifications.

Other financial indicators. Appendix Exhibit G6 shows that both specifications estimated that RCHD participation decreased hospitals' average age of physical plant. The magnitude of the effect across specifications was similar: -2.9 years for the main model and -3.1 years for the state-restricted model. Neither model showed any impact of the RCHD on other financial indicators.

Medicare revenue indicators. Appendix Exhibit G6 shows that both specifications estimated that RCHD participation increased Medicare swing bed revenue share, and the effect size was very similar. No impact was seen for the other Medicare revenue indicators in either specification.

Exhibit 6.8: Sensitivity Checks Results: Financial Margins, All Cohorts and Hospitals of All Market Typologies

	Total Profit Margin	Operating Margin	Medicare Inpatient Margin	Medicare Combined Margin
Panel A: Full Sample DID Results (Summary from Section 6.5)				
Estimate	-0.79	-0.24	13.71***	8.81***
p-value	[0.61]	[0.91]	[0.00]	[0.00]
Sample Size (Number of Hospital-Years)	8,984	8,984	8,995	9,003
Number of RCHD Hospitals	29	29	29	29
Number of Comparison Hospitals	511	511	511	511
Panel B: Full Sample DID Results with Comparison Group from Non-Eligible States				
Estimate	−0.83	0.45	10.63**	7.82**
p-value	[0.64]	[0.88]	[0.02]	[0.01]
Sample Size (Number of Hospital-Years)	7,786	7,786	7,795	7,803
Number of RCHD Hospitals	29	29	29	29
Number of Comparison Hospitals	457	457	457	457

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. The comparison group was defined using an entropy balancing method.

6.9.2 Testing Parallel Baseline Trends

Appendix Exhibits D17 and D18 show the outcome trends for the four profitability indicators—total profit margin, operating profit margin, Medicare inpatient margin, and Medicare combined margin—for the baseline and demonstration periods ("1" indicates the start of the demonstration), for the MMA and ACA cohort, respectively. In each case, the margin trends of the constructed comparison group and of the RCHD hospitals are either overlapping or parallel at baseline.[101] The trends for the other outcomes are presented in Appendix Exhibits D19 to D22. We also estimated whether the baseline outcome trends were parallel using a regression test by estimating a model with indicators for each year relative to the first year of the hospitals' cohort and examining the coefficients on the baseline relative year indicators, and an F-test of their joint statistical significance. These results are shown in Appendix Exhibit G4.

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[101] Operating margin trends between the −200% to −100% segment are an exception; here, the comparison group has a steeper declining trend than the RCHD group.

Results show that using the criterion of the parallel trends test "passing" if the F-test is not significant, the parallel trends test passed for every outcome estimated except for one: share of Medicare revenue from swing beds. Below, we detail the magnitude of the baseline coefficient estimates for outcomes with statistically significant demonstration effects, including Medicare swing bed revenue share, and how we interpret these results.

The average of the baseline coefficient estimates, relative to the RCHD hospitals' baseline means, are 10 percent for Medicare inpatient margin, 6 percent for Medicare combined margin, and 9 percent for average age of physical plant, and the demonstration effects for each outcome are substantially larger in magnitude and statistical significance than the baseline coefficient estimates. As a result, we are confident that the DID results are causal impacts of the demonstration.

The average of the baseline coefficient estimates, relative to the RCHD hospitals' baseline mean, is 39 percent for Medicare swing bed revenue share, and these coefficients are statistically significant. However, despite these results, we discuss this result as a key finding of this report for two primary reasons: (1) the baseline coefficient estimates are the opposite sign (baseline coefficient estimates are negative while the demonstration effect is positive) of the demonstration effect, which suggests that the demonstration effect may be an underestimate of the demonstration because this implies that the demonstration group was decreasing more than the comparison group in the baseline period, and (2) the demonstration effect is more than twice as large as the average of the baseline coefficients.

6.9.3 Randomization Inference

As discussed in Section 3.1.2.4, we performed two types of inference to determine statistical significance in all regression analyses in this section. Randomization inference was used as an alternative to traditional inference because it does not rely on asymptotic approximations and is therefore a more reliable measure of statistical significance with small sample sizes. We found that the vast majority of results were consistent (both significant or insignificant at the 10 percent level). Specifically, only seven results total out of all regression analyses in this section were inconsistent, and the p-values were generally similar. In six out of seven of the inconsistent cases, the estimate was statistically significant with traditional inference but not randomization inference.

CONCLUSION

This is the *First RCHD Interim Evaluation Report* after the CCA extension. As noted earlier, a 2018 *Report to Congress* describing the effect of the RCHD on hospitals' financial condition between FY 2005 and FY 2013 was publicly released in 2018. That report analyzed participant hospital characteristics, impact of the RCHD on finances and other outcomes, and decisions participant hospitals made in anticipation of the ending of the Demonstration.[102] This evaluation report covers some of the same topic areas covered by the *Report to Congress* (characteristics of participant hospitals, impact of the RCHD), but it includes more hospitals in the analyses (33 versus 22), more years of data (FYs 2005–2017 versus FYs 2005–2013), and uses a more rigorous approach to estimate the Demonstration's impact.

Using both descriptive and multivariate methods, this evaluation found that for most participants, the RCHD achieved its goal of providing higher Medicare payments for covered inpatient hospital services. Descriptive statistics show that Medicare inpatient margins increased substantially, by 18 percentage points, from -18.6 percent In the three years prior to participation, to -0.7 percent after.   Under the RCHD, participant hospitals received higher payments for inpatient services (acute care and swing bed services) that were, on average, $1.8 million per year, or 41 percent, more than what they would have received under Medicare payment systems. The additional RCHD payments also increased over the 17 year study period, from $1.5 million per year at the start of the demonstration in 2005 to $2.45 million per year by 2017. The demonstration did not increase the Medicare margins of RCHD hospitals located Isolated market (N = 5), although this finding may be affected by the small sample size.

A multivariate DID analysis found that the RCHD boosted the Medicare inpatient margins by 14 percentage points on average, relative to a comparison group of similar hospitals. The RCHD did not have an impact on the other financial measures studied. These included operating margins (all payer), total profit margins (all income), and most of the other financial indicators analyzed, including days cash on hand, long-term debt-to-capitalization ratio, debt-service coverage ratio, ratio of salaries to net patient revenue, and hospital full-time equivalents (FTEs) per occupied bed. The RCHD was associated with higher capital investments (i.e., reduction in

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[102] CMS. (2018, October). *Report to Congress: Rural Community Hospital Demonstration*. https://innovation.cms.gov/files/reports/rch-rtc.pdf

the average age of physical plant). Consequently, the financial condition remained strong for participating hospitals before and during the demonstration.

Between FY 2005 and FY 2017, 16 of the 33 MMA and ACA hospitals left the RCHD either by closure, withdrawing prematurely before the end of the statutory 5 year period, or by not continuing participation under a new RCHD authorization. The RCHD continued after 2017 with the addition of 12 hospitals that first joined the RCHD under the CCA authorized extension, making a total of 29 hospitals in the demonstration at the end of 2017.

Most of CMS' demonstrations and models are being affected by changes in health care delivery associated with the COVID-19 pandemic. The impact of the pandemic on rural hospitals may vary depending on factors such as increased costs for personnel and personal protective equipment, restrictions on discretionary procedures, and the number of cases in each hospital area. These factors are likely to affect evaluation results that use data from FY 2020 and FY 2021. The public health emergency does not affect the results reported in this document apart from its impact on the availability of RCHD hospital representatives to participate in key informant interviews, but the effects of the pandemic will be incorporated and discussed in future reports.

Limitations. There are some limitations to our analysis. First, the small number of participant hospitals in Isolated markets limited our ability to detect statistically significant effects for hospitals in these markets. Second, hospitals exited the RCHD at different points during the Demonstration. These exits could potentially affect the composition of the sample that was being analyzed, which in turn could bias the impact estimates. For future reports, we intend to analyze this possibility in more detail.

APPENDIX A: RCHD PAYMENT METHODOLOGY

In this appendix, we describe in more detail how RCHD payments are calculated. RCHD payments are calculated by MACs using the formulas described below. In the base year, hospitals receive reimbursement set at the current reasonable and allowable costs for inpatient care in acute care beds or swing beds. In the years subsequent to the base year, hospitals receive the lesser of the current year reasonable and allowable costs or a target amount based on base year costs.

Base year cost reimbursement

Hospital reimbursement in the base year, for both acute care and swing bed services, depends on how routine costs are calculated under the demonstration. Routine costs per day (RCD) are calculated according to the following formula:

$$RCD = \frac{(Days^{IP} \times TICD + Days^{SB} \times MSR)}{(Days^{IP} + Days^{SB})} \tag{1}$$

Where,

$TICD$ denotes the total inpatient cost per diem across all payers;

MSR denotes the Medicare rate for swing beds at the hospital;

$Days^{IP}$ is the total number of inpatient routine days; and

$Days^{SB}$ is the total number of swing bed SNF days.

Following this, the **total inpatient routine costs** under the demonstration are given by:

$$IP\ ROUTINE\ COST = RCD\ X\ Days^{MIP} \tag{2}$$

Where, $Days^{MIP}$ is the total number of Medicare acute inpatient days.

And, similarly, **total swing bed SNF routine costs** under the demonstration are given by:

$$SWING\ BED\ SNF\ ROUTINE\ COST = RCD\ X\ Days^{MSB} \tag{3}$$

Where, $Days^{MSB}$ is the total number of Medicare swing bed days.

Base-year cost reimbursement for hospitals is derived from acute care and/or swing bed routine costs, depending on the composition of services offered by the hospital and also includes costs for ancillary services. Ancillary costs are for services other than room, board, and medical and nursing services that are provided to hospital patients in the course of care and can be

attributed to a hospital department and billed separately. They include laboratory, radiology, pharmacy, and physical therapy services.[103]

As shown above, the RCD is a weighted average of swing bed and acute care bed costs, using Medicare rates, but total days across all payers. By contrast, total routine costs are based on Medicare days for each bed type (acute or swing). Since swing beds have lower costs than acute care beds, the following would occur in the case of a 1-to-1 substitution from Medicare acute care beds to Medicare swing beds:

1. RCD would **decrease** because $Days^{IP}$ would decrease by the same as $Days^{SB}$ would increase, and $TICD > MSR$ because swing beds have lower cost than acute care beds.
    a. RCHD payments would therefore be **lower** than if the substitution to swing beds had not occurred, assuming that hospitals did not change their allocation of beds for other payers, which was the case.
2. Swing beds have lower costs than acute care beds, and due to the discrepancy between the calculation of the RCD (using total days) and routine costs (using only Medicare days), the decrease in costs would be **larger** than the **decrease** in the RCHD payments, resulting in **larger** Medicare inpatient margins by substituting Medicare acute care beds for Medicare swing beds.

Therefore, if hospitals can use Medicare swing beds for post-acute SNF care instead of acute care, they would receive slightly lower RCHD payments, but the substitution would have a positive impact on their Medicare inpatient margins. Hospitals receive substantially higher payments from Medicare swing beds under RCHD than they would under SNF PPS. Additionally, the RCD, and thus RCHD payments, increase if the hospital has acute care beds rather than swing beds for non-Medicare payers. Hospitals thus have an incentive to have a higher number of Medicare swing beds and a higher number of acute care beds for other payers. This is not unique to the demonstration; it is a feature of the CAH swing bed methodology.

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[103] Provider Reimbursement Manual - Part 1 Chapter 22, Determination of Cost of Services to Beneficiaries (2019) Centers for Medicare & Medicaid Services. Retrieved from https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/2018Downloads/R478PR1.pdf

APPENDIX B: INTERVIEW GUIDES

B1. Interview Discussion Guide - Exiting MMA Hospitals

1. Introduction

My name is ___, and I am a researcher from Mission Analytics Group. Thank you for agreeing to participate in an interview about the Rural Community Hospital Demonstration – the RCHD. IMPAQ International and its partner, Mission Analytics Group, have been contracted by the Centers for Medicare and Medicaid Services (CMS) to serve as the independent evaluator for the RCHD. This evaluation will examine the demonstration's effects on Medicare payments and hospital financial condition, with a focus on hospital experience under the third solicitation. The evaluation team includes a group of researchers who led the previous RCHD evaluations.

In preparation for our interview today, we have reviewed materials related to your hospital, including your application to the RCHD and annual reports, notes from the previous RCHD interview(s), and cost report data. We want to use this interview to learn more about whether the impact of the demonstration on your hospital's finances has changed over time and if so, what might be driving those changes. We would also like to hear any relevant updates on your hospital operations and market environment and your plans for sustainability after the demonstration.

Before we begin, I'd like to take a minute to review the informed consent for the interview and how we will handle the information you provide:

- We will use the information you share with us for research purposes only.

- All of your responses will be kept confidential. You will not be identified in any published materials.

- No one, except the research team, will have access to the specific information you provide, and we will only report summary information from our full set of interviews.

- This interview will last approximately 1 hour.

Now that we have gone through the informed consent information, **do you agree to be interviewed?**

- Yes

- No

With your permission, we would like to audio-record the interview to ensure that we record and analyze your remarks accurately. Only the research team will have access to the recording. **Would it be okay to audio-record the interview?**

[If Yes, start recording by pressing RECORD, then continue]

The recording has started, for the record can you confirm that you agree to have this interview audio-recorded?

Do you have any questions about the interview before we begin?

[If YES, answer any questions]

- When we spoke to you last, your main responsibilities were [*summarize*]. Is that still true?

  Or

- To start, please tell me a little bit about yourself. How long have you been serving as [JOB TITLE] in your hospital? What are your current responsibilities? What did you do before?

2. Demonstration Payments

Let's start by talking about your decision to continue participating in the demonstration under the second extension and factors that might influence your demonstration payments.

1. According to my records, you have been participating in the demonstration since *[year]*. When the demonstration was extended in 2016, what made the hospital decide to continue? Please describe the **decision-making process**.

   a) Did you and others in hospital leadership weigh the pros and cons of other payment options? If so, which ones and what did you consider? Did any recent changes to these programs make you reconsider your participation in the RCHD? *Probe on specific payment options: IPPS, including August 2019 Final Rule, which increased wage index values for some hospitals, Sole Community Hospital (SCH), Critical Access Hospital (CAH), Medicare Dependent Hospital (MDH), Low-Volume Adjustment.*

   b) Did your hospital have any **technical support** during the decision-making process – e.g., through your health care system administrator or a contractor?

c) What types of analyses were conducted?

2. Now, let's talk about the **payments** themselves and how they have impacted your **Medicare inpatient margins**. According to cost report data from the previous evaluation *[briefly describe Medicare inpatient margins prior to the demonstration until 2016].*

   a) How would you describe your hospital's Medicare inpatient margins before and after joining the demonstration?

   b) How have they changed since 2016?

3. Now, let's talk about the **aspects of your hospital's finances or operations that may have impacted your hospital's RHC payments**, over time and potentially relative to other eligible hospitals.

   a) After the base year, has your hospital received payments based on the target amount or cost? [*If target amount*] What are the reasons costs were higher in the base year? [*If cost*] How has your hospital contained costs, so they are less than the projected target amount?

   b) How did the rebasing under the most recent extension affect your hospital's payments?

   c) The previous evaluation indicated that swing bed designation and the provision of skilled nursing services in these beds could affect hospital payments. According to the cost reports, *[briefly describe hospital's use of swing beds and changing average daily census until 2016].* Do you think swing bed designation could have affected your hospital's demonstration payments? How so?

   d) What other aspects of your hospital's operations do you think could have impacted your hospital's payments?

   e) Has the payment structure affected your cost controls?

4. What would you change about the demonstration payments so they better support your hospital? [*Probe: the equation for calculating the target amount, the auditing/adjustment process*]

5. Have you considered withdrawing from the demonstration? Why? Why did you decide to stay?

3. Overall Financial Performance and Impact of the Demonstration

Now, I'd like to focus our conversation on your hospital's overall financial performance and the impact of the demonstration, including programs and projects that you have implemented with demonstration payments. Based on what I have seen, I understand that *[summarize hospital overall margins].*

1. How would you characterize your hospital's financial viability?

    a) What **factors influence your hospital's viability** (e.g., payer mix, competition, declining population, staff recruitment and retention, other revenue sources, such as a local government subsidy).

    b) What is your hospital's strategy for achieving or sustaining **long-term** financial viability (e.g., joining a health care system, adding or removing service lines, marketing, cutting costs)?

2. Now let's talk about the role of the demonstration on hospital finances and other community benefits.

    a) How important is the demonstration to your hospital's financial viability? In other words, how would you describe your overall margins before and after you joined the demonstration?

    b) Based on what I have seen, I understand that [summarize the **programs and projects** the hospital has implemented with demonstration payments]. Is that still accurate?

    c) Have you implemented any new projects?

    d) Would these projects still be operating without the demonstration payments?

    e) What have been the community impacts of these projects? How many Medicare and non-Medicare beneficiaries have been impacted? How have you tracked the impact?

4. Sustainability: Post-Demonstration Plans

1. What are your hospital's plans to sustain financial viability after the demonstration?

    a) Will your hospital pursue new or revert back to previous payment options, such as CAH, SCH, or MDH?

b) Will the hospital implement major structural changes (e.g., convert to nursing facility or outpatient health care center, join a health care system, add or remove service lines, cut costs)?

2. What might happen to the projects that have been supported by the demonstration when the payments end? What has your hospital done to improve sustainability of the projects?

5. Hospital Profile

Now, I'd like to update the general information I have about the hospital. Based on what I've read, I understand that *[summarize information from other sources about hospital structure, size, operations].* Is that accurate? Let's talk about what has changed regarding:

1. Your hospital's **ownership, governance, or structure**

    a) Free-standing facility versus part of a hospital network

    b) Affiliation with a government entity

    c) Contracts with other organizations

2. Your hospital's **service lines**

    a) Types and levels of inpatient services

    b) When and where patients are transferred if the hospital does not provide the service (inpatient or outpatient)

    c) Services that generate revenue or operate at a loss

    d) Services recently added or dropped

3. Your hospital's **staffing**

    a) Size and skill mix of workforce

    b) Use of temporary, transient, or contract labor

    c) Recruitment/retention

4. Strategic challenges

6. Health Care Market

Finally, let's discuss your health care market, including the local economy, population demographics, and other health care providers in the area. Again, based on what I have read, I understand that *[summarize information from other sources about health care environment].* Let's talk about what has changed regarding:

1. The **economy** of the region (or service area) and any anticipated changes

   a) Strength of local economy

   b) Major employers and potential dependency

   c) Ways in which the local economy is affecting hospital operations

2. **Population demographics**, health needs and impact on hospital operations

3. The **health care providers** in the region and the health care services available (e.g., availability of primary care physicians and specialists)

   a) Competition for outpatient care (e.g., physician-owned ambulatory surgery centers, diagnostic tests)

   b) Competition for inpatient care

   c) Strategies to increase competitiveness

4. The **health insurance market** in the area

   a) Managed care penetration

   b) Main insurance providers

   c) Payer mix, including uninsured or private pay individuals, hospital participation in the Disproportionate Share Hospital (DSH) program for Medicare or Medicaid, and impact of the Affordable Care Act and or other federal, state or local policies on payer mix

   d) Participation in an Accountable Care Organization (ACO) and arrangement

5. The **labor market** for health care professionals in your area

   Is there anything else you would like to add about your hospital or its experience under the demonstration? Thank you for taking the time to talk to us today.

B2. Interview Discussion Guide - New Hospitals under the CCA

1. Introduction

My name is ___, and I am a researcher from Mission Analytics Group. Thank you for agreeing to participate in an interview about the Rural Community Hospital Demonstration – the RCHD. IMPAQ International and its partner, Mission Analytics Group, have been contracted by the Centers for Medicare and Medicaid Services (CMS) to serve as the independent evaluator for the RCHD. This evaluation will examine the demonstration's effects on Medicare payments and hospital financial condition, with a focus on hospital experience under the third solicitation. The RCHD was initially authorized in 2003 under the Medicare Modernization Act, extended in 2008 under the Affordable Care Act, and then extended once again under the Cures Act. Your hospital joined during this last solicitation. The evaluation team includes a group of researchers who led the previous RCHD evaluations.

In preparation for our interview today, we have reviewed your hospital's website, application to the RCHD, and cost report data through 2016. We have also reviewed public information on your hospital area's economy and demographics. We hope to use this interview as a way to for you to provide us with updated and more detailed information.

Before we begin, I'd like to take a minute to review the informed consent for the interview and how we will handle the information you provide:

- We will use the information you share with us for research purposes only.

- All of your responses will be kept confidential. You will not be identified individually in any published materials.

- No one, except the research team, will have access to the specific information you provide, and we will only report summary information from our full set of interviews.

- This interview will last approximately 1 hour.

Now that we have gone through the informed consent information, **do you agree to be interviewed?**

- Yes

- No

With your permission, we would like to audio-record the interview to ensure that we record and analyze your remarks accurately. Only the research team will have access to the recording. **Would it be okay to audio-record the interview?**

[If Yes, start recording by pressing RECORD, then continue]

The recording has started. For the record can you confirm that you agree to have this interview audio-recorded?

Do you have any questions about the interview before we begin?

[If YES, answer any questions]

To start, please tell me a little bit about yourself. How long have you been serving as [*job title*] in your hospital? What are your current responsibilities? What did you do before?

2. Environment

Now, I'd like to make sure I understand the environment your hospital operates in, including the local economy and population demographics. From what I have read, I understand that *[summarize]*. Is that right? What else can you tell me about:

1. The **economy** of the region (or service area)

   a) What types of jobs are prevalent (e.g., tourism, agriculture, etc.)? Do these jobs tend to be seasonal or stable throughout the year?

   b) Who are the major employers? Is your hospital a major employer in the community?

   c) Is the economy changing? How so? Are any of these changes affecting hospital operations and service use?

2. The **social environment** of the area

   a) Based on what I've read, [*describe area demographic characteristics*]. Is there something you'd like to add?

   b) Is the population changing in any important way? Has changing demographics affected the hospital's operations, or could it affect operations in the future?

Is there anything else we should know about the environment your hospital operates in that makes it unique or creates particular challenges?

3. Hospital Profile

Now, I'd like to focus on _____ Hospital, in particular. Again, based on what I've read, I understand that *[summarize information from other sources about hospital structure, size, operations].* Is that accurate? What else can you tell me about:

1. Your hospital's **ownership, governance, or structure**

   a) Has your hospital changed ownership structure since you submitted the application? Has your hospital experienced any other major ownership changes? [*If applicable*] Why did the hospital change ownership structure?

   b) Are there any partnerships or affiliations that are a key part of your hospital's operations?

2. Your hospital's **service lines**

   a) What types and levels of inpatient services do you provide? For what services do you typically transfer patients? Where do you transfer them?

   b) What inpatient services are your hospital's primary generators of revenue? Which ones operate at a loss?

   c) How important are outpatient services as a source of revenue?

   d) Have you recently added or dropped service lines, or do you plan to? Why?

3. Your hospital's **staffing**

   a) According to your 2016 cost report, your hospital had [*number*] full-time equivalents (FTEs). How would you describe the mix of your workforce in terms of clinical and non-clinical staff, specialists, and physicians versus other clinical staff, such as PAs and NPs?

   b) To what extent do you rely on temporary, transient, or contract labor? What types of services do these individuals provide?

   c) Does your hospital own any physician practice groups? Have you recently acquired any practice groups? Why did your hospital acquire them? [*Probe: to improve your hospital's financial viability and/or to keep these practices open to maintain community access*]

d) How would you describe staff recruitment/retention? Turnover?

4. Your hospital's **key strategic challenges**

   a) What do you see as the 2-3 top strategic challenges for the hospital?

   b) How are you responding to these challenges?

4. Health Care Market

What about the health care market in your area? Again, based on what I have read, I understand that *[summarize information from other sources about health care environment].* Is that accurate? What else can you tell me about:

1. The **health care providers** in the region and the health care services available (e.g., availability of primary care physicians and specialists)

   a) Are there competing providers for inpatient care in your community, such as any specialty hospitals, regional hospitals or other small rural hospitals, such as CAHs? What about outpatient care (e.g., physician-owned ambulatory surgery centers)? Is this putting pressure on the hospital to update and expand its facilities?

   b) Is that changing in any important way?

   c) What makes you competitive in your health care market? What service lines are your hospital's most and least competitive?

   d) What could you do/have you done to become more competitive?

2. The **health insurance market** in the area

   a) How would you describe your hospital's payer mix, including uninsured or private pay individuals?

   b) Has it changed over the years? How has the Affordable Care Act or other federal, state or local policies affected your hospital's payer mix?

   c) What share of Medicare beneficiaries are enrolled in Medicare Advantage? Similarly, is your state's Medicaid program primarily managed care or fee for service?

   d) What are the largest health insurers in the area? Are they typically Health Maintenance Organizations (HMOs) or Preferred Provider Organizations

(PPOs)? How would you describe competition in the health insurance market and changes in plan types (e.g., high deductible plans) and cost sharing?

3. Is your hospital part of an **Accountable Care Organization** (ACO)?

   a) If so, please describe the model and how it has impacted your hospital operations, quality of care, and finances.

   b) What is the penetration of ACOs in your area?

4. The **labor market** for health care professionals in your area

   a) Are there shortages of key professionals? How do you attract and retain staff to your hospital?

   b) Is the labor market for hospital or health care professionals changing in any important way?

5. The **health needs** of the population

   a) Are there particular health care needs that characterize the population of your service area (e.g., prevalence of chronic disease, disability, aging population)?

   b) Are these needs changing in any important way?

5. The Demonstration Compared To Other Payment Options

Now, we'd like to talk about why your hospital chose to apply for the demonstration and its tradeoffs compared to other payment strategies.

1. Why did the hospital **apply** for the RCHD?

2. Please describe the **decision-making process**.

   a) Did you and others in hospital leadership weigh the pros and cons of other payment options? If so, which ones and what did you consider? Did any recent changes to these programs make you reconsider your hospital's participation in the RCHD? [*Probe on specific payment options: IPPS, including August 2019 Final Rule, which increased wage index values for some hospitals, Sole Community Hospital (SCH), Critical Access Hospital (CAH), Medicare Dependent Hospital (MDH), Low-Volume Adjustment.*]

      i. [*If applicable*] As we understand it, your hospital had been **designated as a SCH**, which entitled you to cost-based reimbursement for

Medicare inpatient services. Is this correct? If so, were your payments based on current IPPS rates, or base year costs per discharge updated to the current year?

b) Did your hospital have any **technical support** during the decision-making process – e.g., through your health care system administrator or a contractor?

c) What types of analyses were conducted?

d) Why didn't your hospital apply during the **first or second solicitation** (e.g., not eligible)? Did you know about the demonstration? If your hospital had been eligible, would the hospital have applied?

3. Now, let's talk about the **RHC payments themselves.**

a) After the base year, has your hospital received payments based on the target amount or cost? [*If target amount*] What are the reasons costs were higher in the base year? [*If cost*] How has your hospital contained costs, so they are less than the projected target amount?

b) The previous evaluation indicated that swing bed designation and the provision of skilled nursing services in these beds could affect hospital payments. Do you think swing bed designation could have affected your hospital's demonstration payments? How so?

c) What other aspects of your hospital's operations do you think could have impacted your payments?

d) How do RCHD payments compare to other payment options such as IPPS? Are they sufficient to maintain operations?

4. What would you change about the demonstration payments so they better support your hospital? [*Probe: the equation for calculating the target amount, the auditing/adjustment process*]

5. Have you ever considered **withdrawing** from the demonstration? Why?

6. Finance Performance

We have reviewed cost report data as part of this evaluation, but I'd also like to get your perspective on the hospital's financial situation. Let's first talk about what is generally influencing

your hospital's financial viability. Then, we can move on to the effects of the demonstration. Based on what I have seen, I understand that *[summarize information from other sources about the hospital's financial situation and influencing factors prior to the demonstration].* Is that accurate?

1. What are the **major positive and negative forces** affecting your hospital's financial condition? Have any of these forces changed since joining the demonstration?

2. How would you describe the **uncompensated care** (bad debt + free care) before the demonstration started?

   a) Are you designated as a Disproportionate Share Hospital (DSH) for purposes of Medicare reimbursement? Medicaid?

   b) Do you receive any compensation from local government authorities or other sources for free care?

3. What **non-operating sources of revenue** have you relied on (e.g., local government subsidy, investments, donations, rent)?

4. What is your perception of your hospital's **access to capital**? Are capital projects funded in part through local bond issues?

5. *[If financial viability is a concern]* How would you describe your hospital's **strategy for achieving or sustaining long-term financial viability**?

7. Impact of the Demonstration on Financial Performance and Community Benefits

Now, let's talk about how the demonstration has affected your hospital's financial viability.

1. How would you describe your hospital's **Medicare inpatient margins** before and after joining the demonstration?

2. How do you think the demonstration's cost-based reimbursement affected your **financial bottom line**? In other words, how would you describe your overall margins before and after you joined the demonstration?

3. Is the demonstration's financial impact what you **expected**?

Now, I'd like to focus our conversation on how your community may have been impacted by the demonstration. Based on what I read in your application, I understand that *[summarize the programs and projects the hospital planned to implement with demonstration payments].* Is that accurate?

1. How are you using the **additional payments** from the demonstration? What were your hospital's initial goals for the demonstration payments? *[If applicable]* Why the change? [*Probe on whether payments were used to support operational costs or were invested in areas that would improve hospital financial viability or efficiency.*]

2. Were these projects or activities **already planned or underway** before you participated in the demonstration, or were they new?

3. Would these projects still be operating without the demonstration payments?

4. What have been the **community impacts** of these projects or activities? How many Medicare and non-Medicare beneficiaries have been impacted? How do you **track** community impacts?

5. Is there anything else that is important for us to understand about your hospital's participation in the demonstration, or the projects you have undertaken?

Thanks for taking the time to talk to us today. This has been very helpful, and we look forward to talking to you one more time before the demonstration ends to see how things are progressing.

ALTERNATE PAYMENT OPTIONS

1. Separate Designation

- Inpatient Prospective Payment System (IPPS): Payment per inpatient discharge based on Diagnostic Related Group (DRG) and wage index. The August 2019 IPPS Final Rule increases the wage index for rural hospitals; hospitals that have a wage index value below the 25th percentile get an increase that is "half the difference between the otherwise applicable wage index value for that hospital and the 25th percentile wage index value across all hospitals." In addition, a hospital's final wage index for FY 2020 will not be less than 95 percent of its final wage index for FY 2019.

- Sole Community Hospital (SCH): Criteria: 1) At least 35 miles from a like hospital; OR 2a) No more than 25 percent of Medicare inpatient beneficiaries admitted to another hospital within the service area or 35-mile radius or 2b) Fewer than 50 beds and some exceptions to the 25 percent service area rule; OR 3) Between 15 and 25 miles from

another hospital but inaccessible due to weather or topography; <u>OR</u> 4) Travel time to nearest hospital is 45 minutes due to speed limits, weather, etc. Inpatient operating payments are based on the higher of the hospital-specific payment rate or the federal rate. Capital payments are like all IPPS hospitals. Payments have not been rebased since 2006. SCHs also receive a 7.1 percent augmentation to the Outpatient Prospective Payment System (OPPS) rates for all outpatient services except drugs and biologicals. RCHD hospitals retain their SCH designation and thus, continue to receive this OPPS enhancement.

- <u>Medicare Dependent Hospital (MDH)</u>: Criteria: Have least 60 percent of inpatient days or discharges attributable to Medicare beneficiaries, located in a rural area, have 100 or fewer beds, and not be classified as a SCH. Inpatient operating payments are based on the higher of the hospital-specific payment rate or the federal rate. The MDH program was not approved for FY 2018, but the August 2019 IPPS Final Rule extended the program for five years. Retroactive payments will be provided. Payments have not been rebased since 2002.

- <u>Critical Access Hospital: Criteria</u>: Fewer than 26 acute care beds, located more than 35 miles from another hospital, average length of stay of 96 hours, and 24/7 emergency care services. States could waive the proximity limit prior to 2006. Hospitals receive 101 percent of inpatient and outpatient costs, but payments were affected by sequestration.

2. Payment Add-ons

- <u>Low-Volume Adjustment (*offset by RCHD payment*)</u>: 2011-2017 criteria: Have fewer than 1,600 Medicare discharges and be located 15 miles or more from the nearest subsection (d) hospital. Extended with the same criteria for 2018 under the Bipartisan Budget Act of Feb. 2018. For 2020-2023, the August 2019 IPPS Final Rule increases the number of total discharges to 3,800. Payments are adjusted by number of discharges, starting with a 25 percent add-on for hospitals with fewer than 500 discharges.

- <u>Disproportionate Share Hospital (DSH)</u>: Criteria: Serve a significantly disproportionate number of low-income individuals. Payment add-on is based on number of beds and the "disproportionate patient percentage (DPP).

B3. Interview Discussion Guide - Continuing, ACA Hospitals

1. Introduction

My name is ___, and I am a researcher from Mission Analytics Group. Thank you for agreeing to participate in an interview about the Rural Community Hospital Demonstration – the RCHD. IMPAQ International and its partner, Mission Analytics Group, have been contracted by the Centers for Medicare and Medicaid Services (CMS) to serve as the independent evaluator for the RCHD. This evaluation will examine the demonstration's effects on Medicare payments and hospital financial condition, with a focus on hospital experience under the third solicitation. The evaluation team includes a group of researchers who led the previous RCHD evaluation.

In preparation for our interview today, we have reviewed materials related to your hospital, including your application to the RCHD and annual reports, notes from the previous interview(s), and cost report data. We want to use this interview to learn more about whether the impact of the demonstration on your hospital's finances has changed over time and if so, what might be driving those changes. We would also like to hear any relevant updates on your hospital operations and market environment.

Before we begin, I'd like to take a minute to review the informed consent for the interview and how we will handle the information you provide:

- We will use the information you share with us for research purposes only.
- All of your responses will be kept confidential. You will not be identified in any published materials.
- No one, except the research team, will have access to the specific information you provide, and we will only report summary information from our full set of interviews.
- This interview will last approximately 1 hour.

Now that we have gone through the informed consent information, **do you agree to be interviewed?**

- Yes
- No

With your permission, we would like to audio-record the interview to ensure that we record and analyze your remarks accurately. Only the research team will have access to the recording. **Would it be okay to audio-record the interview?**

[If Yes, start recording by pressing RECORD, then continue]

The recording has started, for the record can you confirm that you agree to have this interview audio-recorded?

Do you have any questions about the interview before we begin?

[If YES, answer any questions]

- When we spoke to you last, your main responsibilities were [*summarize*]. Is that still true?

Or

To start, please tell me a little bit about yourself. How long have you been serving as [JOB TITLE] in your hospital? What are your current responsibilities? What did you do before?

2. Demonstration Payments

Let's start by talking about your hospital's decision to continue participating in the demonstration when it was extended and factors that might influence your hospital's demonstration payments.

1. According to my records, the hospital joined the demonstration under the ACA in [*year*]. When the demonstration was extended, what made the hospital decide to continue? Please describe the **decision-making process**.

   a) Did you and others in hospital leadership weigh the pros and cons of other payment options? If so, which ones and what did the hospital consider? Did any recent changes to these programs make you reconsider your hospital's participation in the RCHD? [*Probe on specific payment options: IPPS, including August 2019 Final Rule, which increased wage index values for some hospitals, Sole Community Hospital (SCH), Critical Access Hospital (CAH), Medicare Dependent Hospital (MDH), Low-Volume Adjustment*]

   b) Did your hospital have any **technical support** during the decision-making process – e.g., through your health care system administrator or a contractor?

   c) What types of analyses were conducted?

   d) *[If hospital is in one of the original eligible states]* Why did the hospital decide not to participate in the demonstration when it began in 2004?

2. Now, let's talk about the **payments** themselves and how they have impacted your **Medicare inpatient margins**. According to cost report data from the previous evaluation *[briefly describe Medicare inpatient margins prior to the demonstration until 2016].*

   a) How would you describe your Medicare inpatient margins before and after joining the demonstration?

   b) How have payments and your Medicare inpatient margins changed since 2016?

3. Now, let's talk about the **aspects of your hospital's finances or operations that may have impacted your hospital's RHC payments**, over time and potentially relative to other eligible hospitals.

  a) After the base year, has your hospital received payments based on the target amount or cost? [*If target amount*] What are the reasons costs were higher in the base year? [*If cost*] How has your hospital contained costs, so they are less than the projected target amount?

  b) How did the rebasing under the extension affect your hospital's payments?

  c) The previous evaluation indicated that swing bed designation and the provision of skilled nursing services in these beds could affect hospital payments. According to the cost reports, *[briefly describe hospital's use of swing beds and changing average daily census until 2016].* Do you think swing bed designation could have affected your hospital's demonstration payments? How so?

  d) What other aspects of your hospital's operations do you think could have impacted your hospital's payments?

  e) How do RCHD payments compare to other payment options such as IPPS? Are they sufficient to maintain operations?

  f) Has the payment structure affected your cost controls?

4. What would you change about the demonstration payments so they better support your hospital? [*Probe: the equation for calculating the target amount, the auditing/adjustment process.*]

5. Have you considered withdrawing from the demonstration? Why? Why did you decide to stay?

3. Overall Financial Performance and Impact of the Demonstration

Now, I'd like to focus our conversation on your hospital's overall financial performance and the impact of the demonstration, including programs and projects that you have implemented with demonstration funds. Based on what I have seen, I understand that *[summarize hospital overall margins]*.

1. How would you characterize your hospital's financial viability?

  a) What **factors influence your hospital's viability** (e.g., payer mix, competition, declining population, staff recruitment and retention, other revenue sources, such as local government subsidy).

  b) What is your hospital's strategy for achieving or sustaining **long-term** financial viability (e.g., joining a health care system, adding or removing service lines, marketing, cutting costs)?

2. Now let's talk about the role of the demonstration on hospital finance and other community benefits.

a) How important is the demonstration to your hospital's financial viability? In other words, how would you describe your overall margins before and after you joined the demonstration?

b) Based on what I have seen, I understand that [*summarize the **programs and projects** the hospital has implemented with demonstration payments*]. Is that still accurate?

c) Have you implemented any new projects or activities? [*Probe on whether payments were used to support operational costs or were invested in areas that would improve hospital financial viability or efficiency.*]

d) Would these projects still be operating without the demonstration payment?

e) What have been the community impacts of these projects? How many Medicare and non-Medicare beneficiaries have been impacted? How do you **track** community impacts?

3. Is there anything else that is important for us to understand about your hospital's participation in the demonstration, or the projects you have undertaken?

4. Hospital Profile

Now, I'd like to update the general information I have about the hospital. Based on what I've read, I understand that *[summarize information from other sources about hospital structure, size, operations].* Is that accurate? Let's talk about what has changed regarding:

1. Your hospital's **ownership, governance, or structure**

    a) Free-standing facility versus part of a hospital network

    b) Affiliation with a government entity

    c) Contracts with other organizations

2. Your hospital's **service lines**

    a) Types and levels of inpatient services

    b) When and where patients are transferred if the hospital does not provide the service (inpatient and outpatient)

    c) Services that generate revenue or operate at a loss

    d) Services recently added or dropped

3. Your hospital's **staffing**

    a) Size and skill mix of workforce

    b) Use of temporary, transient, or contract labor

    c) Recruitment/retention

4. Strategic challenges

5. Health Care Market

Finally, let's discuss your health care market, including the local economy, population demographics, and other health care providers in the region. Again, based on what I have read, I understand that *[summarize information from other sources about health care environment]*. Let's talk about what has changed regarding:

1. The **economy** of the region (or service area)

    a) Strength of local economy and any anticipated changes

    b) Major employers

    c) Ways in which the local economy is affecting hospital operations

2. **Population demographics**, health needs and impact on hospital operations

3. The **health care providers** in the area and the health care services available (e.g., availability of primary care physicians and specialists)

    a) Competition for outpatient care (e.g., physician-owned ambulatory surgery centers, diagnostic tests)

    b) Competition for inpatient care

    c) Strategies to increase competitiveness

4. The **health insurance market** in the area

    e) Managed care penetration

    f) Main insurance providers

    g) Payer mix, including uninsured or private pay individuals, hospital participation in the Disproportionate Share Hospital (DSH) program for Medicare or Medicaid, and impact of the Affordable Care Act and or other federal, state or local policies on payer mix

5. Is your hospital part of an **Accountable Care Organization** (ACO)?

    c) If so, please describe the model and how it has impacted your hospital operations, quality of care, and finances.

    d) What is the penetration of ACOs in your area?

6. The **labor market** for health care professionals in your area

Thanks for taking the time to talk to us today. This has been very helpful, and we look forward to talking to you one more time before the demonstration ends to see how things are progressing.

ALTERNATE PAYMENT OPTIONS

1. Separate Designation

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- Sole Community Hospital (SCH): Criteria: 1) At least 35 miles from a like hospital; OR 2a) No more than 25 percent of Medicare inpatient beneficiaries admitted to another hospital within the service area or 35-mile radius or 2b) Fewer than 50 beds and some exceptions to the 25 percent service area rule; OR 3) Between 15 and 25 miles from another hospital but inaccessible due to weather or topography; OR 4) Travel time to nearest hospital is 45 minutes due to speed limits, weather, etc. Inpatient operating payments are based on the higher of the hospital-specific payment rate or the federal rate. Capital payments are like all IPPS hospitals. Payments have not been rebased since 2006. SCHs also receive a 7.1 percent augmentation to the Outpatient Prospective Payment System (OPPS) rates for all outpatient services except drugs and biologicals. RCHD hospitals retain their SCH designation and thus, continue to receive this OPPS enhancement.

- Medicare Dependent Hospital (MDH): Criteria: Have least 60 percent of inpatient days or discharges attributable to Medicare beneficiaries, located in a rural area, have 100 or fewer beds, and not be classified as a SCH. Inpatient operating payments are based on the higher of the hospital-specific payment rate or the federal rate. The MDH program was not approved for FY 2018, but the August 2019 IPPS Final Rule extended the program for five years. Retroactive payments will be provided. Payments have not been rebased since 2002.

- Critical Access Hospital: Criteria: Fewer than 26 acute care beds, located more than 35 miles from another hospital, average length of stay of 96 hours, and 24/7 emergency care services. States could waive the proximity limit prior to 2006. Hospitals receive 101 percent of inpatient and outpatient costs, but payments were affected by sequestration.

2. Payment Add-ons

- Low-Volume Adjustment (*offset by RCHD payment*): 2011-2017 criteria: Have fewer than 1,600 Medicare discharges and be located 15 miles or more from the nearest subsection (d) hospital. Extended with the same criteria for 2018 under the Bipartisan Budget Act of Feb. 2018. For 2020-2023, the August 2019 IPPS Final Rule increases the number of total discharges to 3,800. Payments are adjusted by number of discharges, starting with a 25 percent add-on for hospitals with fewer than 500 discharges.

- Disproportionate Share Hospital (DSH): Criteria: Serve a significantly disproportionate number of low-income individuals. Payment add-on is based on number of beds and the "disproportionate patient percentage (DPP)."

APPENDIX C: INTERVIEWS QUALITATIVE CODING TABLE

Parent Code	Sub code	Description
1. Financial Motivation and Performance		
a) Reason for joining/continuing demonstration and decision-making process	Why hospital joined/remains in the demonstration; who was involved in decision-making; whether motivation has changed over time (*potential cross-code with 1d, 3a, or 3b)*
b) Other payment options	Pros and cons of other payment options (e.g., CAH, SCH) compared to the demonstration; hospital's payment mechanism prior to joining the demonstration; what the hospital would move to if it withdraws
c) Reasons for not participating under previous solicitations	Why (if applicable) the hospital did not participate under a previous RCHD solicitation
d) Overall financial performance	Discussion of financial margins and overall performance and changes over time
e) Major financial stressors	Major factors stressing the hospital financially (*cross-code with at least one other code*)
f) Major financial facilitators	Major factors helping the hospital financially (*cross-code with at least one other code*)
2. Demonstration Payments		
a) Receiving payments based on target versus cost	Whether the hospital receives payments based on target versus cost and why
b) Role of swing beds	Whether the hospital has swing beds and how they have affected payments; whether the hospital is considering swing beds in the future
c) Role of base year and rebasing	Discussion about how the base year and/or rebasing has affected payment

d)	Changes in payments over time	Whether the hospital's payments have changed over time or are expected to change; factors influencing these changes (*potential cross-code*)
e)	Comments/feedback on demonstration	Perceptions of demonstration overall, criticism, and/or suggestions for improvement; comments on the calculation method not previously coded (e.g., consumer price index, allocation of costs); reconciliation process
	3. Impact of the Demonstration	
a)	Role of demonstration in hospital financial viability	Whether and/or how the demonstration affects long-term financial viability
b)	Role of demonstration in supporting specific projects/initiatives	Whether and/or how the demonstration supports specific projects or initiatives, e.g., new service lines (*potential cross-code with at least one other code*)
	4. Hospital Profile, Services, and Staffing	
a)	Ownership/governance	Details about current hospital ownership and governance and/or recent structural changes; pros and cons of being part of a healthcare systems versus independent
b)	Service lines	Details about hospital inpatient and/or outpatient service lines; utilization over time; discharges; inpatient days; services that are profitable or not; services that might be cut (including without the demonstration) (*potential cross-code with 3b*)
c)	Staffing practices and recruitment/retention	Details about hospital staffing practices, recruitment, and retention (*potential cross-code with 4d*)
d)	Strategic challenges	Top non-financial strategic challenges identified by hospital leadership (*cross-code with at least one other code*). *Note that most strategic challenges are financial in nature, so this code should be used sparingly. Instead, use code 1e.*
e)	Participation in ACO	Discussion of ACO structure, incentives, shared savings; reasons for participating or not
f)	Payer mix	Hospital's typical payer mix (private pay, private insurance, Medicaid, etc.)

	5. Health Care Market	
a)	Competitive landscape	Discussion of competition with other hospitals or providers; recent or potential changes to the landscape
b)	Insurance market and policy landscape	Discussion of insurance market, reimbursement rates, largest insurers in region, or relevant federal/state policies and programs (e.g., ACA)
c)	Competitive advantages	What makes the hospital competitive in the market (e.g., specific service lines, location) (*Potential cross-code*)
d)	Competitive disadvantages	What makes the hospital less competitive in the market (*Potential cross-code*)

	6. Economic, Social, and Geographic Environment	
a)	Economy of region	Details about regional economy and/or recent economic changes; major employers; hospital's role in the local economy as an employer
b)	Social and demographic environment	Details about hospital's social and demographic environment and/or social/demographic characteristics of patient population; immigration; out-migration; age of population
c)	Major community health needs	Most significant health needs in community (e.g., chronic illness, cancer)
d)	Unique geography	Geographical features and/or barriers that are unique to hospital's region (e.g. mountainous)

	7. Good Quotes	
a)	Good Quotes	Quotes that can be used in final report/publications

APPENDIX D: TOPIC AREA 1 EXHIBITS

Attributes of RCHD Participants Exhibits

Exhibit D1: Attributes of RCHD Participants, by Cohort of Entry

Attribute	MMA Cohort (FY: 2005-2017)			ACA Cohort (FY: 2011-2017)		
		N (Hosp.)	N (Obs.)		N (Hosp.)	N (Obs.)
Margins & Financial Indicators						
Average (Std. Dev) Medicare Inpatient Margin	-1.15% (8.09%)	16	100	-0.20% (7.78%)	16	99
Average (Std. Dev) Medicare Combined Margin	-8.09% (9.99%)	16	100	-14.12% (10.11%)	16	99
Average (Std. Dev) Total Profit Margin	5.09% (7.18%)	16	100	0.55% (10.76%)	16	99
Average (Std. Dev) Operating Margin	1.39% (13.95%)	16	100	-2.27% (11.73%)	16	99
Average (Std. Dev) Days Cash on Hand	152 (186)	16	100	93 (113)	16	99
Average (Std. Dev) Long-Term Debt to Capitalization Ratio	24.90% (21.42%)	16	100	22.05% (30.84%)	16	99
Average (Std. Dev) Ratio of Salaries to Net Patient Revenue	44.45% (9.18%)	16	100	42.29% (8.62%)	16	99
Average (Std. Dev.) FTEs per Adjusted Occupied Beds	9.32 (5.33)	16	100	6.87 (2.38)	16	99
Average (Std. Dev) Average Age of Physical Plant	11 (8)	16	100	13 (12)	16	94
Average (Std. Dev) Medicare Share of Inpatient Discharges	40.77% (9.52%)	16	100	46.26% (9.28%)	16	99
Average (Std. Dev) Medicare Share of Inpatient Days	55.56% (12.17%)	16	100	59.06% (10.91%)	16	99
Average (Std. Dev) Medicare Swing Bed Revenue Share	13.07% (17.06%)	16	100	12.90% (14.55%)	16	99
Hospital Characteristics						
Number (%) Member of a Health System	77 (77%)	16	100	56 (57%)	16	99
Number (%) Non-Profit	76 (76%)	16	100	53 (54%)	16	99
Number (%) For- Profit	0 (0%)	16	100	10 (10%)	16	99
Number (%) Public	24 (24%)	16	100	36 (36%)	16	99
Average (Std. Dev.) ADC Acute Care Beds	16 (7)	16	100	12 (9)	16	99
Average (Std. Dev.) ADC Swing Beds	2 (3)	16	100	2 (2)	16	99
Average (Std. Dev.) Total Acute Care Beds	41 (5)	16	100	40 (8)	16	99

Exhibit D1: Attributes of RCHD Participants, by Cohort of Entry					
	MMA Cohort (FY: 2005-2017)			**ACA Cohort (FY: 2011-2017)**	
Attribute		**N (Hosp.)**	**N (Obs.)**	**N (Hosp.)**	**N (Obs.)**
Average (Std. Dev.) Total Medicare Discharges	670 (290)	16	100	595 (256)	16	99
Average (Std. Dev.) Total Medicaid Discharges	279 (177)	16	100	233 (180)	16	99
Average (Std. Dev.) Total Discharges	1,716 (743)	16	100	1,313 (549)	16	99
Average (Std. Dev.) Case Mix Index	1.13 (0.13)	16	100	1.20 (0.16)	16	99
Number (%) Disproportionate Share Hospital Year Observations	58 (58%)	16	100	34 (34%)	16	99
Market-Area Characteristics					
Average (Std. Dev.) Number of Hospitals within Market Area	2 (20)	16	100	5 (3)	16	99
Average (Std. Dev.) Miles to Nearest Acute Care Hospital	39 (26)	16	100	21 (8)	16	99
Average (Std. Dev.) of CAHs within Market Area	2 (2)	16	100	3 (2)	16	99
Number (%) in Isolated Market Area	11 (11%)	16	100	19 (19%)	16	99
Number (%) in Frontier Market Area	55 (55%)	16	100	6 (6%)	16	99
Number (%) in Competitive Market Area	34 (34%)	16	100	74 (75%)	16	99
County/State Characteristics					
Average (Std. Dev.) Population	27,609 (14,615)	16	100	33,385 (26,766)	16	99
Average (Std. Dev.) Population per Square Mile	17 (17%)	16	100	42 (35%)	16	99
Average (Std. Dev) % over 65	14% (4%)	16	100	18% (4%)	16	99
Average (Std. Dev) % with More than High School Education	60% (7%)	16	100	56% (8%)	16	99
Average (Std. Dev) % White Non-Hispanic	82% (14%)	16	100	80% (22%)	16	99
Average (Std. Dev) % of Residents below 150% of Poverty Line	21% (6%)	16	100	26% (9%)	16	99
Average (Std. Dev) % Unemployed	6% (3%)	16	100	6% (3%)	16	99
Average (Std. Dev) Median Household Income (in tens)	5,852 (1,386)	16	100	4,936 (1,001)	16	99
Average (Std. Dev) Median Home Value (in thousands)	165 (71)	16	100	146 (63)	16	99
Number (%) in Medicaid Expansion States	8 (8%)	16	100	38 (38%)	16	99

Notes: N(Hosp.) denotes the number of hospitals, and N(Obs.) denotes the number of hospital-years. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data.

Exhibit D2: Attributes of RCHD Participants, by Cohort of Entry: Distributions of Select Characteristics

Attribute	MMA Cohort (FY: 2005-2017)			ACA Cohort (FY: 2011-2017)		
	10th Percentile	Median	90th Percentile	10th Percentile	Median	90th Percentile
Margins & Financial Indicators						
Medicare Inpatient Margin	-11.93%	0.07%	5.80%	-6.94%	0.14%	5.83%
Medicare Combined Margin	-22.29%	-6.33%	1.18%	-25.32%	-13.77%	-1.38%
Total Profit Margin	-4.15%	4.57%	15.67%	-9.91%	0.35%	15.00%
Operating Margin	-9.87%	3.16%	13.99%	-15.39%	-2.74%	15.00%
Days Cash on Hand	3	90	519	-3	40	310
Long-Term Debt to Capitalization Ratio	0.00%	25.54%	51.08%	0.00%	20.16%	42.35%
Ratio of Salaries to Net Patient Revenue	36.51%	42.45%	55.33%	30.31%	44.28%	52.37%
FTEs per Adjusted Occupied Beds	5.36	8.65	12.42	3.90	6.78	10.20
Average Age of Physical Plant	4	10	24	1	11	23
Medicare Share of Inpatient Discharges	29.29%	39.80%	52.08%	34.44%	45.60%	59.07%
Medicare Share of Inpatient Days	38.82%	55.58%	71.37%	46.58%	58.39%	74.16%
Medicare Swing Bed Revenue Share	0.00%	7.02%	49.30%	0.00%	9.24%	40.76%
Hospital Characteristics						
ADC Acute Care Beds	2	17	24	7	11	19
ADC Swing Beds	0	1	4	0	1	5
Total Acute Care Beds	36	41	47	22	43	46
Total Medicare Discharges	143	692	1,049	389	532	1,020
Total Medicaid Discharges	41	262	514	19	223	549
Total Discharges	352	1,907	2,556	711	1,271	2,138
Case Mix Index	0.97	1.14	1.26	0.99	1.22	1.36

Notes: Hospital and hospital-year sample sizes are the same as Exhibit D1. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data.
Source: HCRIS, FY 2002–2017.

Exhibit D3: Attributes of RCHD Participants, Single vs. Multi-Round Participant						
	Single-Round (FY: 2005-2017)			Multi-Round (FY: 2005-2017)		
Attribute		**N (Hosp.)**	**N (Obs.)**		**N (Hosp.)**	**N (Obs.)**
Margins & Financial Indicators						
Average (Std. Dev) Medicare Inpatient Margin	-0.84% (6.94%)	12	41	-0.64% (8.18%)	20	158
Average (Std. Dev) Medicare Combined Margin	-9.24% (7.53%)	12	41	-11.57% (11.08%)	20	158
Average (Std. Dev) Total Profit Margin	3.84% (8.05%)	12	41	2.57% (9.72%)	20	158
Average (Std. Dev) Operating Margin	0.94% (9.81%)	12	41	-0.79% (13.70%)	20	158
Average (Std. Dev) Days Cash on Hand	71 (105)	12	41	136 (165)	20	158
Average (Std. Dev) Long-Term Debt to Capitalization Ratio	25.05% (22.45%)	12	41	23.07% (27.50%)	20	158
Average (Std. Dev) Ratio of Salaries to Net Patient Revenue	43.02% (8.89%)	12	41	43.47% (8.99%)	20	158
Average (Std. Dev.) FTEs per Adjusted Occupied Beds	7.24 (2.57)	12	41	8.32 (4.63)	20	158
Average (Std. Dev) Average Age of Physical Plant	11 (12)	12	41	13 (10)	20	153
Average (Std. Dev) Medicare Share of Inpatient Discharges	44.41% (8.48%)	12	41	43.26% (10.09%)	20	158
Average (Std. Dev) Medicare Share of Inpatient Days	56.58% (9.91%)	12	41	57.49% (12.10%)	20	158
Average (Std. Dev) Medicare Swing Bed Revenue Share	6.76% (8.59%)	12	41	14.60% (16.85%)	20	158
Hospital Characteristics						
Number (%) Member of a Health System	38 (93%)	12	41	95 (60%)	20	158
Number (%) Non-Profit	40 (98%)	12	41	89 (56%)	20	158
Number (%) For- Profit	0 (0%)	12	41	10 (6%)	20	158
Number (%) Public	1 (2%)	12	41	59 (37%)	20	158
Average (Std. Dev.) ADC Acute Care Beds	17 (8)	12	41	13 (8)	20	158
Average (Std. Dev.) ADC Swing Beds	2 (4)	12	41	2 (2)	20	158
Average (Std. Dev.) Total Acute Care Beds	39 (8)	12	41	40 (6)	20	158
Average (Std. Dev.) Total Medicare Discharges	725 (234)	12	41	609 (281)	20	158
Average (Std. Dev.) Total Medicaid Discharges	281 (179)	12	41	250 (180)	20	158
Average (Std. Dev.) Total Discharges	1,704 (678)	12	41	1,466 (678)	20	158

Exhibit D3: Attributes of RCHD Participants, Single vs. Multi-Round Participant						
	Single-Round (FY: 2005-2017)			**Multi-Round (FY: 2005-2017)**		
Attribute		**N (Hosp.)**	**N (Obs.)**		**N (Hosp.)**	**N (Obs.)**
Average (Std. Dev.) Case Mix Index	1.18 (0.10)	12	41	1.17 (0.16)	20	158
Number (%) Disproportionate Share Hospitals	32 (78%)	12	41	60 (38%)	20	158
Market-Area Characteristics						
Average (Std. Dev.) Number of Hospitals within Market Area	3 (3)	12	41	4 (3)	20	158
Average (Std. Dev.) Miles to Nearest Acute Care Hospital	24 (13)	12	41	32 (23)	20	158
Average (Std. Dev.) of CAHs within Market Area	2 (2)	12	41	3 (3)	20	158
Number (%) in Isolated Market Area	8 (20%)	12	41	22 (14%)	20	158
Number (%) in Frontier Market Area	16 (39%)	12	41	45 (28%)	20	158
Number (%) in Competitive Market Area	17 (41%)	12	41	91 (58%)	20	158
County/State Characteristics						
Average (Std. Dev.) Population	22,894 (7,952)	12	41	32,452 (23,609)	20	158
Average (Std. Dev.) Population per Square Mile	18 (14)	12	41	32 (32)	20	158
Average (Std. Dev) % over 65	16% (14%)	12	41	16% (5%)	20	158
Average (Std. Dev) % with More than High School Education	56% (5%)	12	41	59% (9%)	20	158
Average (Std. Dev) % White Non-Hispanic	80% (20%)	12	41	82% (18%)	20	158
Average (Std. Dev) % of Residents below 150% of Poverty Line	27% (4%)	12	41	23% (8%)	20	158
Average (Std. Dev) % Unemployed	7% (3%)	12	41	6% (3%)	20	158
Average (Std. Dev) Median Household Income (in tens)	4,664 (438)	12	41	5,586 (1,370)	20	158
Average (Std. Dev) Median Home Value (in thousands)	121 (46)	12	41	165 (70)	20	158
Number (%) in Medicaid Expansion States	6 (15%)	12	41	40 (25%)	20	158

Notes: N(Hosp.) denotes the number of hospitals, and N(Obs.) denotes the number of hospital-years. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data.
Source: HCRIS, FY 2002–2017.

Exhibit D4: Attributes of RCHD Participants, Single vs. Multi-Round Participant: Distributions of Select Characteristics

Attribute	Single-Phase (FY: 2005-2017)			Multi-Phase (FY: 2005-2017)		
	10th Percentile	Median	90th Percentile	10th Percentile	Median	90th Percentile
Margins & Financial Indicators						
Medicare Inpatient Margin	-9.01%	-0.05%	5.41%	-10.95%	0.12%	5.83%
Medicare Combined Margin	-21.06%	-7.46%	-0.11%	-24.29%	-10.59%	-0.04%
Total Profit Margin	-7.90%	4.57%	12.90%	-7.95%	2.41%	15.75%
Operating Margin	-11.34%	1.63%	11.24%	-14.51%	-0.34%	14.42%
Days Cash on Hand	1	33	258	2	76	329
Long-Term Debt to Capitalization Ratio	0.36%	26.87%	48.10%	0.00%	22.44%	44.53%
Ratio of Salaries to Net Patient Revenue	32.65%	42.56%	55.43%	31.62%	42.78%	52.87%
FTEs per Adjusted Occupied Beds	5.22	7.02	10.05	4.52	7.49	11.73
Average Age of Physical Plant	0	8	16	3	11	24
Medicare Share of Inpatient Discharges	34.94%	43.89%	57.29%	30.70%	42.43%	56.40%
Medicare Share of Inpatient Days	45.48%	54.83%	70.64%	39.94%	58.38%	73.18%
Medicare Swing Bed Revenue Share	0.00%	4.16%	19.62%	0.00%	9.09%	47.03%
Hospital Characteristics						
ADC Acute Care Beds	8	17	26	3	13	20
ADC Swing Beds	0	0	5	0	1	4
Total Acute Care Beds	21	43	45	31	42	46
Total Medicare Discharges	464	658	1,048	155	558	1,022
Total Medicaid Discharges	140	230	550	31	240	515
Total Discharges	1,005	1,451	2,734	348	1,456	2,307
Case Mix Index	1.04	1.17	1.30	0.97	1.16	1.35

Notes: Hospital and hospital-year sample sizes are the same as Exhibit D3. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data.
Source: HCRIS, FY 2002–2017.

How Participants Compare to Eligible Non-Participants (Distributions of Financial Outcomes Exhibits)

Exhibit D5: Distribution of Hospital Margins, RCHD Hospitals Compared to Eligible Non-Participants

			10th Percentile	Median	90th Percentile
Medicare Inpatient Margin					
MMA	Baseline	RCHD	-31.82%	-17.79%	0.03%
		Eligible Non-Participants	-29.71%	0.93%	24.97%
	Demonstration	RCHD	-11.93%	0.07%	5.80%
		Eligible Non-Participants	-34.44%	1.49%	26.02%
ACA	Baseline	RCHD	-37.21%	-19.62%	-3.08%
		Eligible Non-Participants	-32.39%	2.50%	26.27%
	Demonstration	RCHD	-6.94%	0.14%	5.83%
		Eligible Non-Participants	-40.31%	-0.53%	24.50%
MMA & ACA	Baseline	RCHD	-34.02%	-18.87%	-1.47%
		Eligible Non-Participants	-30.24%	1.35%	25.42%
	Demonstration	RCHD	-10.45%	0.09%	5.83%
		Eligible Non-Participants	-34.44%	1.49%	26.02%
Combined Medicare Margin (Inpatient and Outpatient)					
MMA	Baseline	RCHD	-29.10%	-17.01%	-3.10%
		Eligible Non-Participants	-25.83%	-2.80%	19.23%
	Demonstration	RCHD	-22.29%	-6.33%	1.18%
		Eligible Non-Participants	-34.16%	-3.99%	18.67%
ACA	Baseline	RCHD	-33.36%	-19.55%	-6.32%
		Eligible Non-Participants	-26.86%	-1.64%	19.63%
	Demonstration	RCHD	-25.32%	-13.77%	-1.38%
		Eligible Non-Participants	-41.35%	-7.15%	16.01%
MMA & ACA	Baseline	RCHD	-31.86%	-18.88%	-4.40%
		Eligible Non-Participants	-26.16%	-2.44%	19.47%
	Demonstration	RCHD	-22.92%	-10.00%	-0.04%
		Eligible Non-Participants	-34.16%	-3.99%	18.67%
Operating Margin					
MMA	Baseline	RCHD	-5.29%	2.70%	8.34%
		Eligible Non-Participants	-22.87%	-1.45%	8.62%
	Demonstration	RCHD	-9.87%	3.16%	13.99%
		Eligible Non-Participants	-31.00%	-3.02%	11.85%
ACA	Baseline	RCHD	-12.97%	-0.05%	8.37%
		Eligible Non-Participants	-26.54%	-2.50%	10.98%
	Demonstration	RCHD	-15.39%	-2.74%	15.00%
		Eligible Non-Participants	-37.87%	-4.79%	12.32%
MMA & ACA	Baseline	RCHD	-9.66%	0.97%	8.34%
		Eligible Non-Participants	-23.86%	-1.88%	9.06%
	Demonstration	RCHD	-14.10%	0.14%	14.22%
		Eligible Non-Participants	-31.00%	-3.02%	11.85%

Exhibit D5: Distribution of Hospital Margins, RCHD Hospitals Compared to Eligible Non-Participants

			10th Percentile	Median	90th Percentile
Total Profit Margin					
MMA	Baseline	RCHD	-4.56%	3.77%	9.74%
MMA	Baseline	Eligible Non-Participants	-11.09%	1.56%	10.41%
MMA	Demonstration	RCHD	-4.15%	4.57%	15.67%
MMA	Demonstration	Eligible Non-Participants	-14.08%	1.05%	13.86%
ACA	Baseline	RCHD	-7.90%	2.41%	19.46%
ACA	Baseline	Eligible Non-Participants	-12.36%	0.49%	12.14%
ACA	Demonstration	RCHD	-9.91%	0.35%	15.00%
ACA	Demonstration	Eligible Non-Participants	-16.54%	0.76%	15.16%
MMA & ACA	Baseline	RCHD	-4.95%	3.04%	11.19%
MMA & ACA	Baseline	Eligible Non-Participants	-11.61%	1.21%	10.87%
MMA & ACA	Demonstration	RCHD	-7.95%	2.89%	15.60%
MMA & ACA	Demonstration	Eligible Non-Participants	-14.08%	1.05%	13.86%

Notes: The baseline-periods are as follows: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 pooled (MMA & ACA). The demonstration-periods are as follows: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD denotes standard deviation, N_h denotes number of hospitals, and N_{obs} denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. All financial indicators were calculated from HCRIS data using the technical specifications described in Exhibit 3.1. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data. Due to extreme values, the values for each of the four margins variables are winsorized such that values below –100 are replaced with –100 and values above 100 are replaced with 100. Winsorization of margins affects less than 0.2% of observations for RCHD participants and around 1.66% of observations for non-participants. The sample sizes for this exhibit are the same as in Exhibit 4.1.

*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

Source: HCRIS, FY 2002–2017.

Exhibit D6: Distribution of Other Financial Indicators, RCHD Hospitals Compared to Eligible Non-Participants

			10th Percentile	Median	90th Percentile
Days Cash on Hand					
MMA	Baseline	RCHD	6	60	291
		Eligible Non-Participants	1	42	195
	Demonstration	RCHD	3	90	519
		Eligible Non-Participants	0	35	187
ACA	Baseline	RCHD	0	60	329
		Eligible Non-Participants	0	40	176
	Demonstration	RCHD	-3	40	310
		Eligible Non-Participants	0	31	193
MMA & ACA	Baseline	RCHD	2	60	293
		Eligible Non-Participants	0	42	188
	Demonstration	RCHD	1	59	313
		Eligible Non-Participants	0	35	187
Long-Term Debt to Capitalization Ratio					
MMA	Baseline	RCHD	0.00%	28.05%	55.29%
		Eligible Non-Participants	0.00%	26.54%	85.21%
	Demonstration	RCHD	0.00%	25.54%	51.08%
		Eligible Non-Participants	0.00%	24.24%	89.95%
ACA	Baseline	RCHD	0.00%	24.77%	39.03%
		Eligible Non-Participants	0.00%	25.35%	97.30%
	Demonstration	RCHD	0.00%	20.16%	42.35%
		Eligible Non-Participants	0.00%	20.93%	87.74%
MMA & ACA	Baseline	RCHD	0.00%	25.02%	50.54%
		Eligible Non-Participants	0.00%	26.18%	91.50%
	Demonstration	RCHD	0.00%	22.83%	45.56%
		Eligible Non-Participants	0.00%	24.24%	89.95%
Ratio of Salaries to Net Patient Revenue					
MMA	Baseline	RCHD	37.61%	43.61%	51.85%
		Eligible Non-Participants	34.24%	44.73%	57.60%
	Demonstration	RCHD	36.51%	42.45%	55.33%
		Eligible Non-Participants	30.10%	44.00%	60.05%
ACA	Baseline	RCHD	36.17%	43.36%	58.42%
		Eligible Non-Participants	30.01%	43.16%	58.04%
	Demonstration	RCHD	30.31%	44.28%	52.37%
		Eligible Non-Participants	29.41%	4.99%	63.34%
MMA & ACA	Baseline	RCHD	36.43%	43.51%	52.82%
		Eligible Non-Participants	32.79%	44.30%	57.82%
	Demonstration	RCHD	31.62%	42.73%	53.03%
		Eligible Non-Participants	30.10%	44.00%	60.05%
FTEs per Occupied Bed					
MMA	Baseline	RCHD	4.87	7.62	10.04
		Eligible Non-Participants	3.26	5.48	11.09

Exhibit D6: Distribution of Other Financial Indicators, RCHD Hospitals Compared to Eligible Non-Participants

			10th Percentile	Median	90th Percentile
ACA	Demonstration	RCHD	5.36	8.65	12.42
		Eligible Non-Participants	3.28	5.57	10.20
	Baseline	RCHD	5.12	6.73	8.65
		Eligible Non-Participants	3.56	5.48	9.38
	Demonstration	RCHD	3.90	6.78	10.20
		Eligible Non-Participants	3.28	5.77	10.73
MMA & ACA	Baseline	RCHD	4.98	7.14	9.76
		Eligible Non-Participants	3.35	5.48	10.29
	Demonstration	RCHD	4.52	7.38	11.63
		Eligible Non-Participants	3.28	5.57	10.20
Average Age of Physical Plant					
MMA	Baseline	RCHD	1	10	45
		Eligible Non-Participants	1	10	31
	Demonstration	RCHD	4	10	24
		Eligible Non-Participants	1	9	21
ACA	Baseline	RCHD	5	12	57
		Eligible Non-Participants	0	9	19
	Demonstration	RCHD	1	11	23
		Eligible Non-Participants	1	10	22
MMA & ACA	Baseline	RCHD	1	10	48
		Eligible Non-Participants	1	9	24
	Demonstration	RCHD	2	11	23
		Eligible Non-Participants	1	9	21

Notes: The baseline-periods are as follows: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 pooled (MMA & ACA). The demonstration-periods are as follows: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD denotes standard deviation, N_h denotes number of hospitals, and N_{obs} denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. All financial indicators were calculated from HCRIS data using the technical specifications described in Exhibit 3.1. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data. Due to extreme values, we winsorized the following variables: (a) ratio of salaries to net patient revenue at the 1st and 99th percentile, which affected 1.8% of observations for participants and 2.09% of observations for non-participants; (b) FTEs per occupied bed at the 99th percentile which affected 0.4% of observations for participants and 1% of observations for non-participants; (c) average age of physical plant values at 60 years, which affected 3.2% of observations among participants and 5.7% of observations among non-participants. The sample sizes for this exhibit are the same as in Exhibit 4.2.

*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

Source: HCRIS FY, 2002–2017.

Exhibit D7: Distribution of Medicare-Revenue Financial Indicators, RCHD Hospital and Eligible Non-Participants

			10th Percentile	Median	90th Percentile
Medicare Share of Inpatient Discharges					
MMA	Baseline	RCHD	33.18%	44.13%	63.04%
		Eligible Non-Participants	34.67%	53.73%	70.18%
	Demonstration	RCHD	29.29%	39.80%	52.08%
		Eligible Non-Participants	28.66%	45.96%	64.55%
ACA	Baseline	RCHD	35.58%	47.33%	57.86%
		Eligible Non-Participants	29.46%	46.10%	64.59%
	Demonstration	RCHD	34.44%	45.60%	59.07%
		Eligible Non-Participants	26.65%	43.90%	62.45%
MMA & ACA	Baseline	RCHD	34.38%	46.35%	59.60%
		Eligible Non-Participants	32.59%	51.22%	68.82%
	Demonstration	RCHD	31.75%	42.54%	56.69%
		Eligible Non-Participants	28.66%	45.96%	64.55%
Medicare Share of Inpatient Days					
MMA	Baseline	RCHD	43.85%	63.50%	78.00%
		Eligible Non-Participants	45.44%	65.78%	81.27%
	Demonstration	RCHD	38.82%	55.58%	71.37%
		Eligible Non-Participants	36.35%	56.29%	74.53%
ACA	Baseline	RCHD	48.57%	58.72%	74.10%
		Eligible Non-Participants	37.42%	56.93%	74.80%
	Demonstration	RCHD	46.58%	58.39%	74.16%
		Eligible Non-Participants	34.06%	53.19%	71.41%
MMA & ACA	Baseline	RCHD	46.58%	60.71%	76.58%
		Eligible Non-Participants	41.78%	62.97%	79.93%
	Demonstration	RCHD	41.06%	57.42%	73.12%
		Eligible Non-Participants	36.35%	56.29%	74.53%
Medicare Swing Bed Revenue Share					
MMA	Baseline	RCHD	0.00%	3.37%	19.55%
		Eligible Non-Participants	0.00%	1.97%	12.63%
	Demonstration	RCHD	0.00%	7.02%	49.30%
		Eligible Non-Participants	0.00%	0.09%	8.08%
ACA	Baseline	RCHD	0.00%	2.26%	9.45%
		Eligible Non-Participants	0.00%	0.34%	8.44%
	Demonstration	RCHD	0.00%	9.24%	40.76%
		Eligible Non-Participants	0.00%	0.00%	7.47%
MMA & ACA	Baseline	RCHD	0.00%	2.54%	13.62%
		Eligible Non-Participants	0.00%	1.32%	11.23%
	Demonstration	RCHD	0.00%	8.23%	42.89%
		Eligible Non-Participants	0.00%	0.09%	8.08%

Notes: The baseline-periods are: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 pooled (MMA & ACA). The demonstration-periods are: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). Mt. Edgecumbe hospital is not included because of missing data.

Source: HCRIS, FY 2002–2017.

How Participants Compare to Eligible Non-Participants (T-Test Exhibits for Hospital & Contextual Characteristics)

Exhibit D8: Health System Status and For-Profit Status, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N$_h$	N$_{obs}$
Health System Membership Status							
MMA	Baseline	RCHD	58%	(50%)	-2	16	48
		Eligible Non-Participants	60%	(49%)		912	2,283
	Demonstration	RCHD	77%	(42%)	10**	16	100
		Eligible Non-Participants	67%	(47%)		706	4,993
ACA	Baseline	RCHD	88%	(33%)	5	16	48
		Eligible Non-Participants	83%	(38%)		416	1,135
	Demonstration	RCHD	57%	(50%)	3	16	99
		Eligible Non-Participants	54%	(50%)		503	2,606
MMA & ACA	Baseline	RCHD	73%	(45%)	5.0	32	96
		Eligible Non-Participants	68%	(47%)		1,010	3,418
	Demonstration	RCHD	67%	(47%)	0.0	32	199
		Eligible Non-Participants	67%	(47%)		706	4,993
Non-profit							
MMA	Baseline	RCHD	75%	(44%)	30***	16	48
		Eligible Non-Participants	45%	(50%)		912	2,283
	Demonstration	RCHD	76%	(43%)	34***	16	100
		Eligible Non-Participants	42%	(49%)		706	4,994
ACA	Baseline	RCHD	50%	(51%)	10	16	48
		Eligible Non-Participants	40%	(49%)		416	1,135
	Demonstration	RCHD	54%	(50%)	11**	16	99
		Eligible Non-Participants	43%	(49%)		2,606	503
MMA & ACA	Baseline	RCHD	63%	(49%)	19***	32	96
		Eligible Non-Participants	43%	(50%)		1,010	3,418
	Demonstration	RCHD	65%	(48%)	23***	32	199
		Eligible Non-Participants	42%	(49%)		706	4,994
For-profit							
MMA	Baseline	RCHD	0%	(0%)	-11***	16	48
		Eligible Non-Participants	11%	(32%)		912	2,283
	Demonstration	RCHD	0%	(0%)	-20***	16	100
		Eligible Non-Participants	20%	(40%)		706	4,994
ACA	Baseline	RCHD	13%	(33%)	-11**	16	48
		Eligible Non-Participants	23%	(42%)		416	1,135
	Demonstration	RCHD	10%	(30%)	-9***	16	99
		Eligible Non-Participants	19%	(39%)		2,606	503
MMA & ACA	Baseline	RCHD	6%	(24%)	-9***	32	96
		Eligible Non-Participants	15%	(36%)		1,010	3,418
	Demonstration	RCHD	5%	(22%)	-15***	32	199
		Eligible Non-Participants	20%	(40%)		706	4,994
Public							

Exhibit D8: Health System Status and For-Profit Status, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_{obs}
MMA	Baseline	RCHD	25%	(44%)	-18***	16	48
		Eligible Non-Participants	43%	(50%)		912	2,283
	Demonstration	RCHD	24%	(43%)	-14***	16	100
		Eligible Non-Participants	38%	(49%)		706	4,994
ACA	Baseline	RCHD	38%	(49%)	0	16	48
		Eligible Non-Participants	37%	(48%)		416	1,135
	Demonstration	RCHD	36%	(48%)	-2	16	99
		Eligible Non-Participants	38%	(49%)		2,606	503
MMA & ACA	Baseline	RCHD	31%	(47%)	-10**	32	96
		Eligible Non-Participants	41%	(49%)		1,010	3,418
	Demonstration	RCHD	30%	(46%)	-8**	32	199
		Eligible Non-Participants	38%	(49%)		706	4,994

Notes: The baseline-periods are as follows: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 pooled (MMA & ACA). The demonstration-periods are as follows: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD denotes standard deviation, N_h denotes number of hospitals, and N_{obs} denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data. Means for aggregate periods are the simple average of year-specific means.

*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

***Source**: HCRIS, FY 2002–2017.*

Exhibit D9: Patient Volumes, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_obs
Average Daily Census: Acute Care Beds							
MMA	Baseline	RCHD	14.57	6.76	1.34	16	48
		Eligible Non-Participants	13.23	8.58		912	2,283
	Demonstration	RCHD	15.62	7.33	2.07**	16	100
		Eligible Non-Participants	13.55	38.39		706	4,994
ACA	Baseline	RCHD	16.18	6.30	2.18**	16	48
		Eligible Non-Participants	13.99	10.86		416	1,135
	Demonstration	RCHD	12.36	9.12	0.20	16	99
		Eligible Non-Participants	12.16	51.76		503	2,606
MMA & ACA	Baseline	RCHD	15.37	6.55	1.89***	32	96
		Eligible Non-Participants	13.48	9.40		1,010	3,418
	Demonstration	RCHD	14.00	8.41	0.44	32	199
		Eligible Non-Participants	13.55	38.39		706	4,994
Average Daily Census: Swing Beds							
MMA	Baseline	RCHD	2.01	2.71	0.39	16	48
		Eligible Non-Participants	1.62	3.10		912	2,283
	Demonstration	RCHD	1.77	2.52	0.84***	16	100
		Eligible Non-Participants	0.94	1.74		706	4,994
ACA	Baseline	RCHD	1.57	1.47	0.58***	16	48
		Eligible Non-Participants	0.98	1.60		416	1,135
	Demonstration	RCHD	1.77	2.36	1.03***	16	99
		Eligible Non-Participants	0.74	1.45		503	2,606
MMA & ACA	Baseline	RCHD	1.79	2.18	0.38	32	96
		Eligible Non-Participants	1.41	2.71		1,010	3,418
	Demonstration	RCHD	1.77	2.44	0.84***	32	199
		Eligible Non-Participants	0.94	1.74		706	4,994
Number of Acute Care Beds							
MMA	Baseline	RCHD	43.29	11.93	8.79***	16	48
		Eligible Non-Participants	34.50	10.08		912	2,283
	Demonstration	RCHD	40.74	4.64	5.35***	16	100
		Eligible Non-Participants	35.39	10.57		706	4,994
ACA	Baseline	RCHD	41.25	6.29	5.74***	16	48
		Eligible Non-Participants	35.51	10.77		416	1,135
	Demonstration	RCHD	39.60	7.99	4.33***	16	99
		Eligible Non-Participants	35.27	10.58		503	2,606
MMA & ACA	Baseline	RCHD	42.27	9.54	7.43***	32	96
		Eligible Non-Participants	34.84	10.32		1,010	3,418
	Demonstration	RCHD	40.17	6.53	4.78***	32	199
		Eligible Non-Participants	35.39	10.57		706	4,994

Notes: The baseline-periods are as follows: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 pooled (MMA & ACA). The demonstration-periods are as follows: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD denotes standard deviation, N_h denotes number of hospitals, and N_{obs} denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data. Means for aggregate periods are the simple average of year-specific means.

*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

Exhibit D10: Inpatient Discharges, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_{obs}
Medicare Discharges							
MMA	Baseline	RCHD	711	316	29	16	48
		Eligible Non-Participants	682	380		912	2,283
	Demonstration	RCHD	670	290	59**	16	100
		Eligible Non-Participants	611	375		706	4,994
ACA	Baseline	RCHD	816	337	153***	16	48
		Eligible Non-Participants	663	369		416	1,135
	Demonstration	RCHD	595	256	76***	16	99
		Eligible Non-Participants	520	335		503	2,606
MMA & ACA	Baseline	RCHD	764	329	88**	32	96
		Eligible Non-Participants	676	376		1,010	3,418
	Demonstration	RCHD	633	275	22	32	199
		Eligible Non-Participants	611	375		706	4,994
Medicaid Discharges							
MMA	Baseline	RCHD	255	205	22	16	48
		Eligible Non-Participants	233	227		912	2,283
	Demonstration	RCHD	279	177	67***	16	100
		Eligible Non-Participants	212	241		706	4,994
ACA	Baseline	RCHD	337	209	99***	16	48
		Eligible Non-Participants	238	247		416	1,135
	Demonstration	RCHD	233	180	62***	16	99
		Eligible Non-Participants	171	215		503	2,606
MMA & ACA	Baseline	RCHD	296	210	61***	32	96
		Eligible Non-Participants	235	234		1,010	3,418
	Demonstration	RCHD	256	179	44***	32	199
		Eligible Non-Participants	212	241		706	4,994
Total Discharges							
MMA	Baseline	RCHD	1,642	763	26**	16	48
		Eligible Non-Participants	1,356	791		912	2,283
	Demonstration	RCHD	1,716	743	335***	16	100
		Eligible Non-Participants	1,381	841		706	4,994
ACA	Baseline	RCHD	1,800	729	311***	16	48
		Eligible Non-Participants	1,489	833		416	1,135
	Demonstration	RCHD	1,313	549	68	16	99
		Eligible Non-Participants	1,245	816		503	2,606
MMA & ACA	Baseline	RCHD	1,721	746	321***	32	96
		Eligible Non-Participants	1,400	808		1,010	3,418
	Demonstration	RCHD	1,515	683	134***	32	199
		Eligible Non-Participants	1,381	841		706	4,994

Notes: The baseline-periods are: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 pooled (MMA & ACA). The demonstration-periods are: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD: standard deviation, N_h: number of hospitals, and N_{obs}: number of hospital-years. Difference denotes the difference in means between participants and non-participants. Mt. Edgecumbe hospital is not included because of missing data. Means for aggregate periods are the simple average of year-specific means.

Exhibit D11: Hospital Case Mix Index and Disproportionate Share Status, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N$_h$	N$_{obs}$
Case Mix Index							
MMA	Baseline	RCHD	1.11	0.10	0.07***	16	48
		Eligible Non-Participants	1.04	0.13		911	2,282
	Demonstration	RCHD	1.13	0.13	0.03**	16	100
		Eligible Non-Participants	1.10	0.19		697	4,976
ACA	Baseline	RCHD	1.15	0.12	0.07***	16	48
		Eligible Non-Participants	1.08	0.19		414	1,131
	Demonstration	RCHD	1.20	0.16	0.07***	16	99
		Eligible Non-Participants	1.13	0.21		497	2,594
MMA & ACA	Baseline	RCHD	1.13	0.11	0.08***	32	96
		Eligible Non-Participants	1.05	0.15		1,007	3,413
	Demonstration	RCHD	1.17	0.15	0.07***	32	199
		Eligible Non-Participants	1.10	0.19		697	4,976
Disproportionate Share Status							
MMA	Baseline	RCHD	69%	47%	-5%	16	48
		Eligible Non-Participants	74%	44%		907	2,276
	Demonstration	RCHD	58%	50%	-26%***	16	100
		Eligible Non-Participants	84%	37%		706	4,994
ACA	Baseline	RCHD	77%	42%	-6%	16	48
		Eligible Non-Participants	83%	38%		416	1,135
	Demonstration	RCHD	34%	48%	-51%***	16	99
		Eligible Non-Participants	86%	35%		503	2,606
MMA & ACA	Baseline	RCHD	73%	45%	-4%	32	96
		Eligible Non-Participants	77%	42%		1,006	3,411
	Demonstration	RCHD	46%	50%	-37%***	32	199
		Eligible Non-Participants	84%	37%		706	4,994

Notes: The baseline-periods are as follows: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 pooled (MMA & ACA). The demonstration-periods are as follows: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD denotes standard deviation, N$_h$ denotes number of hospitals, and N$_{obs}$ denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data. Means for aggregate periods are the simple average of year-specific means.

*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

Source: HCRIS, FY 2002–2017.

Exhibit D12: Competitive Landscape, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_obs
Number of Hospitals within Market Area							
MMA	Baseline	RCHD	2	3	-3***	17	50
MMA	Baseline	Eligible Non-Participants	6	4		912	2,283
MMA	Demonstration	RCHD	2	2	-4***	17	107
MMA	Demonstration	Eligible Non-Participants	6	5		705	4,993
ACA	Baseline	RCHD	5	3	-2***	16	48
ACA	Baseline	Eligible Non-Participants	7	6		415	1,134
ACA	Demonstration	RCHD	5	3	-1**	16	99
ACA	Demonstration	Eligible Non-Participants	6	4		503	2,606
MMA & ACA	Baseline	RCHD	4	3	-2***	33	98
MMA & ACA	Baseline	Eligible Non-Participants	6	5		1,009	3,417
MMA & ACA	Demonstration	RCHD	3	3	-3***	33	206
MMA & ACA	Demonstration	Eligible Non-Participants	6	5		705	4,993
Miles to Nearest Acute Care Hospital							
MMA	Baseline	RCHD	28	23	8**	17	50
MMA	Baseline	Eligible Non-Participants	20	18		912	2,283
MMA	Demonstration	RCHD	37	27	18***	17	107
MMA	Demonstration	Eligible Non-Participants	19	11		705	4,993
ACA	Baseline	RCHD	21	8	3**	16	48
ACA	Baseline	Eligible Non-Participants	18	10		415	1,134
ACA	Demonstration	RCHD	21	8	2**	16	99
ACA	Demonstration	Eligible Non-Participants	19	11		503	2,606
MMA & ACA	Baseline	RCHD	24	17	5***	33	98
MMA & ACA	Baseline	Eligible Non-Participants	19	16		1,009	3,417
MMA & ACA	Demonstration	RCHD	29	22	11***	33	206
MMA & ACA	Demonstration	Eligible Non-Participants	19	11		705	4,993
Number of CAHs within Market Area							
MMA	Baseline	RCHD	2	2	1**	17	50
MMA	Baseline	Eligible Non-Participants	1	1		912	2,283
MMA	Demonstration	RCHD	2	2	0	17	107
MMA	Demonstration	Eligible Non-Participants	2	2		705	4,993
ACA	Baseline	RCHD	3	2	1***	16	48
ACA	Baseline	Eligible Non-Participants	2	2		415	1,134
ACA	Demonstration	RCHD	3	2	2***	16	99
ACA	Demonstration	Eligible Non-Participants	2	2		503	2,606
MMA & ACA	Baseline	RCHD	2	2	1***	33	98
MMA & ACA	Baseline	Eligible Non-Participants	1	1		1,009	3,417
MMA & ACA	Demonstration	RCHD	2	2	1***	33	206
MMA & ACA	Demonstration	Eligible Non-Participants	2	2		705	4,993

Notes: Baseline-periods are: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 (MMA & ACA). Demonstration-periods are: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD: standard deviation, N_h: number of hospitals, and N_{obs}: number of hospital-years. Means for aggregate periods are the simple average of year-specific means.*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.
Source: Variables constructed using HCRIS hospital address data, FY 2002–2017.

Exhibit D13: Market Typology, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_obs
Percent Competitive							
MMA	Baseline	RCHD	48%	50%	-34%***	17	50
		Eligible Non-Participants	82%	39%		890	2,255
	Demonstration	RCHD	32%	47%	-49%***	17	107
		Eligible Non-Participants	80%	40%		676	4,901
ACA	Baseline	RCHD	75%	44%	-7%	16	48
		Eligible Non-Participants	82%	38%		415	1,132
	Demonstration	RCHD	75%	44%	-5%	16	99
		Eligible Non-Participants	80%	40%		483	2,568
MMA & ACA	Baseline	RCHD	61%	49%	-20%***	33	98
		Eligible Non-Participants	82%	39%		998	3,387
	Demonstration	RCHD	52%	50%	-28%***	33	206
		Eligible Non-Participants	80%	40%		676	4,901
Percent Frontier							
MMA	Baseline	RCHD	28%	45%	18%***	17	50
		Eligible Non-Participants	10%	30%		890	2,255
	Demonstration	RCHD	51%	50%	39%***	17	107
		Eligible Non-Participants	12%	33%		676	4,901
ACA	Baseline	RCHD	19%	39%	6%	16	48
		Eligible Non-Participants	13%	34%		415	1,132
	Demonstration	RCHD	6%	24%	-5%*	16	99
		Eligible Non-Participants	11%	31%		483	2,568
MMA & ACA	Baseline	RCHD	23%	43%	13%***	33	98
		Eligible Non-Participants	11%	31%		998	3,387
	Demonstration	RCHD	30%	46%	17%***	33	206
		Eligible Non-Participants	12%	33%		676	4,901
Percent Isolated							
MMA	Baseline	RCHD	24%	43%	15%**	17	50
		Eligible Non-Participants	9%	28%		890	2,255
	Demonstration	RCHD	17%	38%	9%**	17	107
		Eligible Non-Participants	7%	26%		676	4,901
ACA	Baseline	RCHD	6%	24%	1%	16	48
		Eligible Non-Participants	5%	21%		415	1,132
	Demonstration	RCHD	19%	40%	10%**	16	99
		Eligible Non-Participants	9%	29%		483	2,568
MMA & ACA	Baseline	RCHD	15%	36%	8%**	33	98
		Eligible Non-Participants	7%	26%		998	3,387
	Demonstration	RCHD	18%	38%	10%***	33	206
		Eligible Non-Participants	7%	26%		676	4,901

Notes: Baseline-periods are: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 (MMA & ACA). Demonstration-periods are: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD: standard deviation, N_h: number of hospitals, and N_{obs}: number of hospital-years. Means for aggregate periods are the simple average of year-specific means. *** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

Source: Variables constructed using HCRIS hospital address data, HSAF, and U.S. Census population data.

Exhibit D14: County Population Characteristics, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N$_h$	N$_{obs}$
Population							
MMA	Baseline	RCHD	21,043	11,977	-13,106***	17	505
MMA	Baseline	Eligible Non-Participants	34,149	87,841		910	2,277
MMA	Demonstration	RCHD	26,385	14,870	-27,846***	17	107
MMA	Demonstration	Eligible Non-Participants	54,230	259,612		705	4,992
ACA	Baseline	RCHD	32,756	25,592	-56,035***	16	48
ACA	Baseline	Eligible Non-Participants	88,791	414,411		416	1,135
ACA	Demonstration	RCHD	33,385	26,766	-8,120*	16	99
ACA	Demonstration	Eligible Non-Participants	41,506	166,642		502	2,604
MMA & ACA	Baseline	RCHD	26,780	20,603	-25,546***	33	98
MMA & ACA	Baseline	Eligible Non-Participants	52,325	250,811		1,008	3,412
MMA & ACA	Demonstration	RCHD	29,749	21,659	-24,481***	33	206
MMA & ACA	Demonstration	Eligible Non-Participants	54,230	259,612		705	4,992
Population per Square Mile							
MMA	Baseline	RCHD	16	13	-29***	17	50
MMA	Baseline	Eligible Non-Participants	44	113		910	2,277
MMA	Demonstration	RCHD	16	17	-48***	17	107
MMA	Demonstration	Eligible Non-Participants	64	190		704	4,986
ACA	Baseline	RCHD	40	33	-55***	16	48
ACA	Baseline	Eligible Non-Participants	95	304		416	1,135
ACA	Demonstration	RCHD	42	35	-13***	16	99
ACA	Demonstration	Eligible Non-Participants	55	133		501	2,598
MMA & ACA	Baseline	RCHD	27	28	-34***	33	98
MMA & ACA	Baseline	Eligible Non-Participants	61	200		1,008	3,412
MMA & ACA	Demonstration	RCHD	28	30	-36***	33	206
MMA & ACA	Demonstration	Eligible Non-Participants	64	190		704	4,986
Percent over 65 Years							
MMA	Baseline	RCHD	15%	5%	-1%	17	50
MMA	Baseline	Eligible Non-Participants	16%	4%		910	2,277
MMA	Demonstration	RCHD	14%	4%	-2%***	17	107
MMA	Demonstration	Eligible Non-Participants	17%	4%		705	4,992
ACA	Baseline	RCHD	16%	4%	0%	16	48
ACA	Baseline	Eligible Non-Participants	16%	3%		416	1,135
ACA	Demonstration	RCHD	18%	4%	0%	16	99
ACA	Demonstration	Eligible Non-Participants	17%	4%		502	2,604
MMA & ACA	Baseline	RCHD	15%	4%	-1%	33	98
MMA & ACA	Baseline	Eligible Non-Participants	16%	4%		1,008	3,412
MMA & ACA	Demonstration	RCHD	16%	4%	-1%**	33	206
MMA & ACA	Demonstration	Eligible Non-Participants	17%	4%		705	4,992
Percent with More than High School Education							
MMA	Baseline	RCHD	53%	8%	-13%***	17	50
MMA	Baseline	Eligible Non-Participants	40%	10%		910	2,277
MMA	Demonstration	RCHD	61%	7%	-16%***	17	107

Exhibit D14: County Population Characteristics, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_{obs}
		Eligible Non-Participants	44%	10%		705	4,992
ACA	Baseline	RCHD	54%	8%	-10%***	16	48
		Eligible Non-Participants	44%	10%		416	1,135
	Demonstration	RCHD	56%	8%	-10%***	16	99
		Eligible Non-Participants	46%	9%		502	2,604
MMA & ACA	Baseline	RCHD	54%	8%	-13%***	33	98
		Eligible Non-Participants	41%	10%		1,008	3,412
	Demonstration	RCHD	59%	8%	-14%***	33	206
		Eligible Non-Participants	44%	10%		705	4,992
Percent with Non-Hispanic White							
MMA	Baseline	RCHD	86%	16%	5%**	17	50
		Eligible Non-Participants	80%	20%		910	2,277
	Demonstration	RCHD	81%	14%	6%***	17	107
		Eligible Non-Participants	75%	22%		705	4,992
ACA	Baseline	RCHD	82%	21%	7%**	16	48
		Eligible Non-Participants	75%	21%		416	1,135
	Demonstration	RCHD	80%	22%	7%***	16	99
		Eligible Non-Participants	74%	23%		502	2,604
MMA & ACA	Baseline	RCHD	84%	19%	5%***	33	98
		Eligible Non-Participants	79%	20%		1,008	3,412
	Demonstration	RCHD	81%	18%	6%***	33	206
		Eligible Non-Participants	75%	22%		705	4,992

Notes: The baseline-periods are as follows: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 pooled (MMA & ACA). The demonstration-periods are as follows: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD denotes standard deviation, N_h denotes number of hospitals, and N_{obs} denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. Means for aggregate periods are the simple average of year-specific means.

*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

Source: HCRIS and SEER, FY 2002-2017.

Exhibit D15: County Economic Characteristics, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_{obs}
Percent of Residents below 150% of Poverty Line							
MMA	Baseline	RCHD	21%	6%	-6%***	17	50
MMA	Baseline	Eligible Non-Participants	28%	9%		910	2,277
MMA	Demonstration	RCHD	21%	6%	-10%***	17	107
MMA	Demonstration	Eligible Non-Participants	31%	8%		705	4,992
ACA	Baseline	RCHD	25%	8%	-6%***	16	48
ACA	Baseline	Eligible Non-Participants	30%	8%		416	1,135
ACA	Demonstration	RCHD	26%	9%	-6%***	16	99
ACA	Demonstration	Eligible Non-Participants	32%	8%		502	2,604
MMA & ACA	Baseline	RCHD	23%	7%	-5%***	33	98
MMA & ACA	Baseline	Eligible Non-Participants	29%	9%		1,008	3,412
MMA & ACA	Demonstration	RCHD	23%	8%	-7%***	33	206
MMA & ACA	Demonstration	Eligible Non-Participants	31%	8%		705	4,992
Unemployment Rate							
MMA	Baseline	RCHD	6%	3%	-1%	17	50
MMA	Baseline	Eligible Non-Participants	6%	3%		910	2,277
MMA	Demonstration	RCHD	6%	3%	-2%***	17	107
MMA	Demonstration	Eligible Non-Participants	8%	4%		705	4,992
ACA	Baseline	RCHD	7%	2%	-2%***	16	48
ACA	Baseline	Eligible Non-Participants	9%	3%		416	1,135
ACA	Demonstration	RCHD	6%	3%	-2%***	16	99
ACA	Demonstration	Eligible Non-Participants	8%	4%		502	2,604
MMA & ACA	Baseline	RCHD	6%	3%	-1%***	33	98
MMA & ACA	Baseline	Eligible Non-Participants	7%	3%		1,008	3,412
MMA & ACA	Demonstration	RCHD	6%	3%	-2%***	33	206
MMA & ACA	Demonstration	Eligible Non-Participants	8%	4%		705	4,992
Median Household Income (in tens)							
MMA	Baseline	RCHD	5,574	1,294	721***	17	50
MMA	Baseline	Eligible Non-Participants	4,853	938		910	2,277
MMA	Demonstration	RCHD	5,955	1,396	1,447***	17	107
MMA	Demonstration	Eligible Non-Participants	4,508	1,006		705	4,992
ACA	Baseline	RCHD	5,086	919	559***	16	48
ACA	Baseline	Eligible Non-Participants	4,526	997		416	1,135
ACA	Demonstration	RCHD	4,936	1,001	502***	16	99
ACA	Demonstration	Eligible Non-Participants	4,434	1,016		502	2,604
MMA & ACA	Baseline	RCHD	5,335	1,147	591***	33	98
MMA & ACA	Baseline	Eligible Non-Participants	4,744	970		1,008	3,412
MMA & ACA	Demonstration	RCHD	5,465	1,322	957***	33	206
MMA & ACA	Demonstration	Eligible Non-Participants	4,508	1,006		705	4,992
Median Home Value (in thousands)							
MMA	Baseline	RCHD	90	36	18***	17	50
MMA	Baseline	Eligible Non-Participants	72	33		910	2,277
MMA	Demonstration	RCHD	176	80	72***	17	107
MMA	Demonstration	Eligible Non-Participants	104	49		705	4,992
ACA	Baseline	RCHD	137	65	30***	16	48
ACA	Baseline	Eligible Non-Participants	106	52		416	1,135
ACA	Demonstration	RCHD	146	63	38***	16	99
ACA	Demonstration	Eligible Non-Participants	108	46		502	2,604

Exhibit D15: County Economic Characteristics, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N$_h$	N$_{obs}$
MMA & ACA	Baseline	RCHD	113	57	30***	33	98
		Eligible Non-Participants	83	43		1,008	3,412
	Demonstration	RCHD	162	74	58***	33	206
		Eligible Non-Participants	104	49		705	4,992

*Notes: Baseline-periods are: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 (MMA & ACA). Demonstration-periods are: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD: standard deviation, N$_h$: number of hospitals, and N$_{obs}$: number of hospital-years. Means for aggregate periods are the simple average of year-specific means.*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10. *** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10. **Source**: HCRIS and SEER, FY 2002-2017.*

Exhibit D16: Medicaid Expansion State Location, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N$_h$	N$_{obs}$
Percentage of Hospitals in Medicaid Expansion States							
MMA	Baseline	RCHD	0%	0%	0%***	33	98
		Eligible Non-Participants	0%	6%		1,010	3,418
	Demonstration	RCHD	23%	42%	11%***	33	206
		Eligible Non-Participants	12%	32%		706	4,994
ACA	Baseline	RCHD	0%	0%	-1%***	16	48
		Eligible Non-Participants	1%	11%		416	1,135
	Demonstration	RCHD	38%	49%	17%***	16	99
		Eligible Non-Participants	22%	41%		503	2,606
MMA & ACA	Baseline	RCHD	0%	0%	0%***	33	98
		Eligible Non-Participants	0%	6%		1,010	3,418
	Demonstration	RCHD	23%	42%	11%***	33	206
		Eligible Non-Participants	12%	32%		706	4,994

Notes: The baseline-periods are as follows: FY 2002-2004 (MMA), FY 2008-2010 (ACA), and FY 2002-2004 & 2008-2010 pooled (MMA & ACA). The demonstration-periods are as follows: FY 2005-2017 (MMA), FY 2011-2017 (ACA), and FY 2005-2017 (MMA & ACA). SD denotes standard deviation, N$_h$ denotes number of hospitals, and N$_{obs}$ denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. Means for aggregate periods are the simple average of year-specific means.

*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.

***Source**: HCRIS & Kaiser Family Foundation list of expansion states and times.*

Financial Outcomes Trends across Participant, Eligible Non-Participant, and Comparison Group Hospitals

The graphs in this section compare trends of hospital financial conditions for three groups: the eligible non-participant group (reference group in Topic Area 1 depicted in beige), the comparison group (reference group in Topic Area 3 (Impact) depicted in grey), and the RCHD participant group (in maroon), prior to the start of the demonstration and during the demonstration period. Graphs are presented separately for MMA and ACA cohorts.

The eligible non-participant group consists of all non-participant hospitals that meet the demonstration eligibility criteria. While, eligible non-participant group trends do not reflect counterfactual trends (i.e. trends in the absence of the demonstration) for the participant group, they are useful to understand how the financial condition of small, rural hospitals have evolved, across the united states, over the period of analysis. The comparison group further trims the eligible non-participant group sample and assigns matching weights using entropy balancing. In many cases, this achieves parallel baseline trends for the comparison group and the participant group. Hence, the comparison group trend line reflects counterfactual trends for the participant group.

Exhibit D17 (MMA cohort) and Exhibit D18 (ACA cohort) compare trends in hospital margins for the three groups. In general, hospitals' Medicare margins tend to be more volatile than their total and operating margins. At baseline, both cohorts of RCHD participants have much lower levels of Medicare inpatient and combined margins than eligible non-participants, and in some cases experience steeper negative trends. The start of the demonstration coincides with large spikes in participating hospitals' Medicare margins. Trend lines for Medicare margins, especially for the MMA cohort, make clear that we would be underestimating the impact of the demonstration if we compared participants to eligible non-participants, rather than to the comparison group constructed for the evaluation. Total and operating margin levels are lower for eligible non-participants, as compared to participants, both before and after the demonstration. However total and operating margin trends are quite similar trends across all three groups, both before and after the start of the demonstration, indicating that the demonstration did not help improve these margins.

Exhibit D17

Trends for Hospital Margins, FY 2002-2017, MMA Cohort

Baseline Period FY 2002-2004 is shaded in beige

■ Mean for RCHD Participants
■ Mean for Comparison Group
■ Mean for Eligible Non-Participants (NonPar)

Medicare Inpatient Margin

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	385	374	368	360	350	339	333	323	312	299	289	275
NonPar N	858	759	664	493	393	380	377	375	378	369	357	379	384	363	370	368

Medicare Combined Margin (Inpatient and Outpatient)

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	385	374	368	360	350	339	333	323	312	299	289	275
NonPar N	858	761	664	493	393	380	379	376	380	370	358	380	385	364	372	369

Total Profit Margin

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	380	373	368	360	350	339	333	323	312	299	289	275
NonPar N	854	759	660	494	393	380	378	369	379	366	358	361	365	346	355	351

Operating Margin
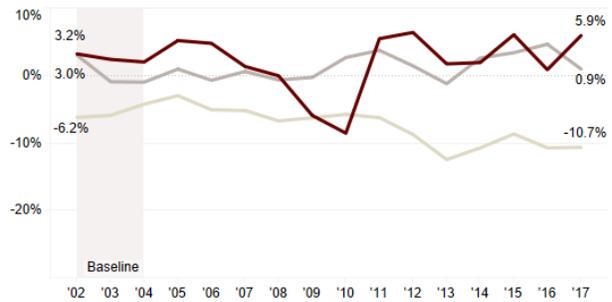
	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	380	373	368	360	350	339	333	323	312	299	289	275
NonPar N	854	759	660	494	393	380	378	369	379	366	358	361	365	346	355	351

Notes: Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data.
Source: HCRIS, FY 2002–2017.

Exhibit D18

Trends for Hospital Margins, FY 2008-2017, ACA Cohort

Legend:
- Mean for RCHD Participants
- Mean for Comparison Group
- Mean for Eligible Non- Participants (NonPar)

Medicare Inpatient Margin

1.9%
0%
-2.6%
Baseline TPA-1
-3.7%
-8.2%
-10%
-19.0%
-20%
-23.0%
Baseline TPA-3

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	366	357	347	334	317	307	294
NonPar N	377	375	378	369	360	379	384	363	370	368

Medicare Combined Margin (Inpatient and Outpatient)

0%
-5.8%
Baseline TPA-1
-10%
-11.4%
-14.1%
-15.6%
-17.0%
-20%
-23.1%
Baseline TPA-3

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	366	358	347	334	317	307	294
NonPar N	379	376	380	370	360	380	385	364	372	369

Total Profit Margin

4.8%
4.3%
0%
-1.6%
Baseline TPA-1
1.5%
-2.5%
-3.5%
-10%
-20%
Baseline TPA-3

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	366	358	347	334	317	307	294
NonPar N	378	369	379	366	360	361	365	346	355	351

Operating Margin

-0.1%
0%
-1.2%
-6.7%
Baseline TPA-1
-8.2%
-9.1%
-10.7%
-10%
-20%
Baseline TPA-3

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	366	358	347	334	317	307	294
NonPar N	378	369	379	366	360	361	365	346	355	351

Notes: Baseline TPA-1 and Baseline TPA-3 denote the baseline periods used by the analyses in Topic Areas 1 and 3, respectively. The earliest start date for a hospital in the ACA cohort is in FY 2011. However, for Topic Area 3, we use a baseline period of FY 2009–2011 because most hospitals in this cohort joined the RCHD toward the end of FY 2011 or in FY 2012.
***Source**: HCRIS, FY 2008–2017.*

Exhibits D19 and D20 examine trends in hospitals' other financial indicators, for hospitals in the MMA and ACA cohort respectively. Two trends are especially worth noting. There is a dramatic increase in MMA hospitals' liquidity, as measured by days cash on hand, during the demonstration period. However, similar gains are not seen for ACA cohort hospitals. On the other hand, declines in average age of physical plant are larger and consistent among ACA cohort hospitals, though in later demonstration years decreases are also observed for MMA cohort hospitals.

Exhibit D19

Trends for Other Financial Indicators, FY 2002-2017, MMA Cohort

Baseline Period FY 2002-2004 is shaded in beige

■ Mean for RCHD Participants
■ Mean for Comparison Group
■ Mean for Eligible Non-Participants (NonPar)

Days of Cash on Hand

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	385	374	368	360	350	339	333	323	312	299	289	275
NonPar N	858	761	664	494	393	380	379	376	380	377	358	381	385	364	372	369

Long-Term Debt-to-Capitalization

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	382	372	368	360	350	339	333	323	312	299	289	275
NonPar N	855	757	660	493	393	380	377	373	378	365	357	359	364	346	355	351

Average Age of Plant

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	333	329	338	344	350	339	333	323	312	299	289	275
NonPar N	661	609	569	428	393	380	368	360	353	351	340	340	342	313	321	317

Salaries to Net Patient Revenue

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	380	373	368	360	350	339	333	323	312	299	289	275
NonPar N	854	759	660	494	393	380	378	369	379	366	357	361	365	346	355	350

FTEs per Occupied Bed

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	380	373	368	360	350	339	333	323	312	299	289	275
NonPar N	854	758	662	492	393	380	375	371	378	364	355	357	360	343	351	348

Notes: Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data.
Source: HCRIS, FY 2002–2017.

Exhibit D20

Trends for Other Financial Indicators, FY 2008-2017, ACA Cohort

Legend:
- Mean for RCHD Participants
- Mean for Comparison Group
- Mean for Eligible Non-Participants (NonPar)

Days Cash on Hand

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	366	358	347	334	317	307	294
NonPar N	379	376	380	377	360	381	385	364	372	369

Long-Term Debt-to-Capitalization

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	365	357	347	334	317	307	294
NonPar N	377	373	378	366	360	359	364	346	355	351

Average Age of Plant

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	14	14	14	10	15	15	14	13	13	14
Comp N	338	344	353	351	340	340	334	313	307	294
NonPar N	363	366	366	366	360	347	342	317	321	317

Salaries to Net Patient Revenue

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	366	357	347	334	317	307	294
NonPar N	378	369	379	366	360	361	365	346	355	350

FTEs per Occupied Bed

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	15	10	16	16	15	14	14	14
Comp N	363	366	366	364	355	347	334	317	307	294
NonPar N	375	371	378	366	360	357	360	343	351	348

Notes: Baseline TPA-1 and Baseline TPA-3 denote the baseline periods used by the analyses in Topic Areas 1 and 3, respectively. The earliest start date for a hospital in the ACA cohort is in FY 2011. However, for Topic Area 3, we use a baseline period of FY 2009–2011 because most hospitals in this cohort joined the RCHD toward the end of FY 2011 or in FY 2012.

Source: HCRIS, FY 2008–2017.

Exhibits D21 and D22 examine trends in Medicare revenue indicators. For both cohorts, trends in Medicare share of inpatient discharges and inpatient days, are stable over time. For both cohorts, demonstration participation coincides with a large and sustained increase in the share of Medicare revenue from swing beds.

Exhibit D21

Trends for Medicare- Specific Indicators, FY 2002-2017, MMA Cohort

Baseline Period FY 2002-2004 is shaded in beige

- Mean for RCHD Participants
- Mean for Comparison Group
- Mean for Eligible Non- Participants (NonPar)

Medicare Share of Inpatient Discharges

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	385	374	368	360	350	339	333	323	312	299	289	275
NonPar N	858	761	664	494	393	380	378	375	379	376	357	380	384	363	370	368

Medicare Share of Inpatient Days

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N..	414	414	414	395	385	374	368	360	350	339	333	323	312	299	289	275
	857	761	664	494	393	380	378	375	379	376	357	380	384	363	370	368

Medicare Swing Bed Share

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	13	10	9	10	11	9	6	6	6	6	6	4	4
Comp N	414	414	414	395	385	374	368	360	350	339	333	323	312	299	289	275
NonPar N	858	759	664	493	393	380	377	375	378	369	357	379	384	363	370	368

Notes: *Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data.*
Source: *HCRIS, FY 2002–2017.*

Exhibit D22

Trends for Medicare- Specific Indicators, FY 2008-2017, ACA Cohort
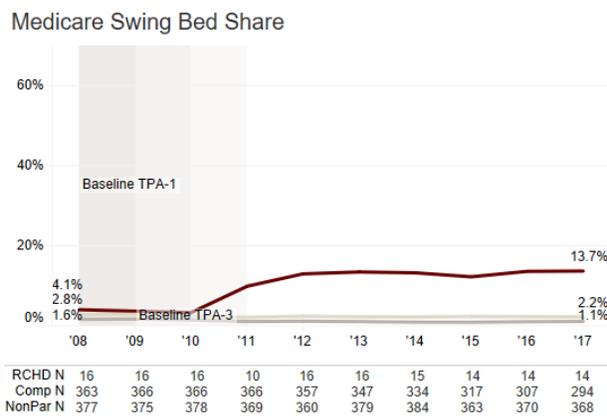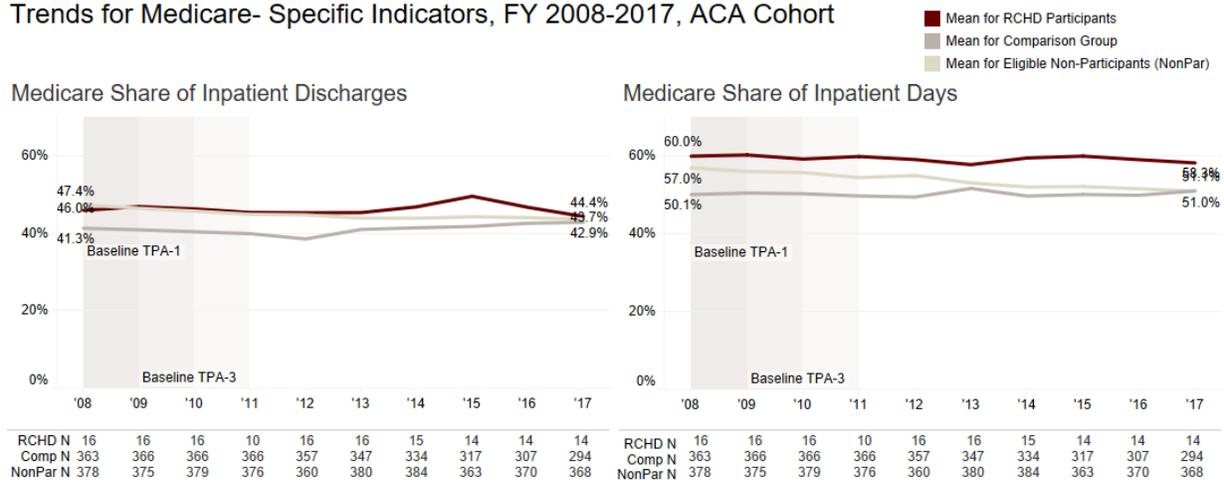
- ■ Mean for RCHD Participants
- ■ Mean for Comparison Group
- ■ Mean for Eligible Non-Participants (NonPar)

Medicare Share of Inpatient Discharges

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	366	357	347	334	317	307	294
NonPar N	378	375	379	376	360	380	384	363	370	368

Medicare Share of Inpatient Days

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	366	357	347	334	317	307	294
NonPar N	378	375	379	376	360	380	384	363	370	368

Medicare Swing Bed Share

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
RCHD N	16	16	16	10	16	16	15	14	14	14
Comp N	363	366	366	366	357	347	334	317	307	294
NonPar N	377	375	378	369	360	379	384	363	370	368

Notes: Baseline TPA-1 and Baseline TPA-3 denote the baseline periods used by the analyses in Topic Areas 1 and 3, respectively. The earliest start date for a hospital in the ACA cohort is in FY 2011. However, for Topic Area 3, we use a baseline period of FY 2009–2011 because most hospitals in this cohort joined the RCHD toward the end of FY 2011 or in FY 2012.
Source: HCRIS, FY 2008–2017.

APPENDIX E: TOPIC AREA 2 EXHIBITS

Relationship between Hospital Characteristics and Additional RCHD Payments over IPPS (IPPS plus SNF PPS)

Exhibit E1 presents the relationship between additional hospital and contextual characteristics and the payment received by hospitals. Characteristics in Exhibit E1 are not directly part of the RCHD payment structure and have not been previously described by the 2018 *Report to Congress* as relevant to it. However, as we mentioned in the Conceptual Model, local socioeconomic factors can potentially affect the additional payments hospitals receive. Exhibit E1 shows that a significantly larger share of hospitals in the second and third payment terciles were government hospitals compared to hospitals in the first payment tercile. In contrast, RCHD participants in the first payment tercile were more likely to be for-profit hospitals. Although all RCHD hospitals were generally located in lower-income communities, hospitals in the third payment tercile, were more likely to be located in markets with relatively lower poverty rate, relatively higher median household income, and relatively higher median home value than hospitals in the first payment tercile, Additionally, hospitals in the third payment tercile were less likely to be in states that had expanded Medicaid under the ACA compared to hospitals in the first and second payment terciles. There was little difference in these contextual characteristics between hospitals in the first and second payment terciles.

Exhibit E1: Attributes of RCHD Hospitals (extended), by additional RCHD over IPPS Payment Tercile									
	Tercile 1 Average ($ million): $0.54 Range ($ million): -$0.13, $1.09			Tercile 2 Average ($ million): $1.61 Range ($ million): $1.09, $2.03			Tercile 3 Average ($ million): $3.49 Range ($ million): $2.07, $5.66		
Hospital/Market characteristics	Mean	Median	Inter Quartile Range	Mean	Median	Inter Quartile Range	Mean	Median	Inter Quartile Range
Other Hospital Contextual Characteristics									
Health System Status	80.95%			47.62%			76.19%		
Non-Profit Hospital Status	82.54%			42.86%			57.14%		
For-Profit Hospital Status	15.87%			0.00%			0.00%		
Government Hospital Status	1.59%			57.14%			42.86%		
Average Daily Census for Acute Care Beds	12	11	9	12	11	7	16	17	5
Average Daily Census for Swing Beds	1	0	2	2	2	2	2	1	3
Percent over 65 years	16.36%			17.30%			13.16%		
High School Education or Less	42.52%	44.41%	6.94%	44.26%	44.51%	11.24%	37.42%	39.36%	12.39%
Percent White Non-Hispanic	79.46%	90.54%	16.97%	81.64%	92.22%	29.32%	79.98%	83.46%	17.55%
Percent of Residents Below 150% Over Poverty Line	26.25%	25.11%	7.37%	26.24%	25.23%	12.27%	17.41%	17.47%	5.04%
Unemployment Rate	6.54%	6.31%	4.90%	5.87%	4.85%	3.91%	6.00%	5.35%	3.63%
Median Household Income ($)	4983.75	4971.00	759.00	4893.76	5150.00	1556.00	6545.17	6262.00	2030.00
Median Home Value (thousand $)	149.25	145.00	47.00	133.08	128.00	84.00	203.25	198.00	161.00
Medicaid Expansion State under ACA	25.40%			26.98%			14.29%		

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) The first tercile includes 14 unique hospitals and 63 hospital years, the second tercile includes 11 unique hospitals and 63 hospital years, and the third tercile includes 7 unique hospitals and 63 hospital years. (4) For hospitals that continue participation across extensions of the Demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.

Year over Year Trends in Base or Rebase Year Costs per Hospital for Fiscal Years FY 2005-2017

Exhibit E2 presents the per hospital costs per discharge (thousand $) in base or rebase years. Compared to the average per hospital costs per discharge observed during the MMA initial authorization (FY 2005 to FY 2009), per hospital costs per discharge were substantially higher in the ACA authorization extension (FY 2010 to FY 2014) and the first three years of the CCA authorization extension (FY 2015 to FY 2017) by $2,000 and $2,900, respectively. However, standard deviation of the costs per discharge also increased. On average, compared to the standard deviation observed during the MMA initial authorization (FY 2005 to FY 2009), the standard deviation during the ACA authorization extension (FY 2010 to FY 2014) and CCA authorization extension (FY 2015 to FY 2017) was higher by $1,900 and $1,800, respectively.

Exhibit E2: Base or Rebase Year Summary Statistics, by Federal Fiscal Years					
Federal Fiscal Year in Which Hospital Fiscal Year Begins	N	Average Base or Rebase Year Cost per Discharge (thousand $)	Std. Dev. Base or Rebase Year Cost per Discharge (thousand $)	Min. Base or Rebase Year Cost per Discharge (thousand $)	Max. Base or Rebase Year Cost per Discharge (thousand $)
2005	13	8.94	2.14	6.09	14.25
2006	9	8.99	2.46	6.09	14.25
2007	9	8.99	2.46	6.09	14.25
2008	9	8.99	2.46	6.09	14.25
2009	10	10.29	3.38	6.09	15.61
2010	9	12.16	4.06	7.37	17.54
2011	17	10.69	4.72	3.73	23.43
2012	23	11.00	4.49	3.73	23.43
2013	22	11.07	4.58	3.73	23.43
2014	21	11.42	4.38	7.07	23.43
2015	18	12.19	5.19	7.07	23.43
2016	12	11.11	2.99	7.42	17.27
2017	17	13.17	5.00	7.42	23.27

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For hospitals that continue participation across extensions of the demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges. (4) These dollar terms are nominal values and were not in FY 2021 terms (adjusted for inflation).
Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Base or Rebase Year Cost per Discharge, Medicare Inpatient Discharges, Swing Bed Discharges Quintiles Discussion

In an alternate model specification in Exhibit E6, we also explored how the RCHD payments over IPPS varied with different base or rebase year cost per discharge, Medicare inpatient discharge, and Medicare swing bed discharge expressed as categorical variables that identify specific range of values from each covariate's distribution.

Exploration of the distribution of the base or rebase cost per discharge, Medicare inpatient discharge, and Medicare swing bed discharges revealed that the distribution was not uniform and applying pre-conceived arbitrary range cut-offs could result in some range groups having too many or too few hospital by year observations. Therefore, we used a data driven approach where the distribution for all three factors of interest is used to divide the range of the data in to five category (quintiles) where each category represents twenty percent of the range. The first quintile references observations where the values of the variable of interest (i.e. base or rebase year cost per discharge, Medicare inpatient discharge, Medicare swing bed discharge) is at the bottom twenty percent of the distribution, the second quintile captures the values of the variable of interest that falls between twenty to forty percent of distribution, etc.

Exhibit E3, presents the average, standard deviation, minimum and maximum value of the base or rebase year cost per discharge (in thousand $) for the listed number of observations within each quintile. We also present the average, standard deviation, minimum and maximum value of the RCHD payments over IPPS (in million $) within each quintile. Exhibit E3 shows that 38 hospital year observations in the first quintile (the bottom twenty percent) had base or rebase cost per discharge that ranged from $3,730 to $7,880. 13 hospital year observations in the third quintile (values between 40th and 60th percentile) had a base or rebase cost per discharge that ranged from $8,580 to $10,870. And 36 hospital year observations in the fifth quintile (values between 80th and 100th percentile) had base or rebase cost per discharge that ranged from $14,310 to $23,430.

Exhibit E4 presents the average, standard deviation, minimum and maximum value of the Medicare inpatient discharges for the listed number of observations within each quintile. We also present the average, standard deviation, minimum and maximum value of the RCHD payments over IPPS (in million $) within each quintile. Exhibit E4 shows that 38 hospital year observations in the first quintile (the bottom twenty percent) had Medicare inpatient discharges that ranged from 0 to 397 discharges. 38 hospital year observations in the third quintile (values

between 40th and 60th percentile) had Medicare inpatient discharges that ranged from 530 to 681 discharges. And 37 hospital year observations in the fifth quintile (values between 80th and 100th percentile) had Medicare inpatient discharges that ranged from 863 to 1,293 discharges.

Exhibit E5, presents the average, standard deviation, minimum and maximum value of the swing bed discharges for the listed number of observations within each quintile. We also present the average, standard deviation, minimum and maximum value of the RCHD payments over IPPS (in million $) among hospital year observations within each quintile. Exhibit E5 shows that 68 hospital year observations in the first quintile (the bottom twenty percent) had no swing bed discharges. 40 hospital year observations in the third quintile (values between 40th and 60th percentile) had swing bed discharges that ranged from 24 to 57 swing bed discharges. And 37 hospital year observations in the fifth quintile (values between 80th and 100th percentile) that ranged from 134 to 638 swing bed discharges.

Exhibit E3: Base or Rebase Year Cost per Discharge Quintile Summary

Outcome	Mean	Standard Deviation	Min	Max	# of Cost Reports	# of Unique Hospitals
Base or Rebase Cost per Discharge Quintile #1						
Base or Rebase Year Cost per Discharge (thousand $)	7.06	1.14	3.73	7.88	38	8
Additional RCHD Payments over IPPS (million $)	0.97	0.52	-0.02	1.80	38	8
Base or Rebase Cost per Discharge Quintile #2						
Base or Rebase Year Cost per Discharge (thousand $)	8.26	0.20	7.98	8.52	40	7
Additional RCHD Payments over IPPS (million $)	1.20	0.81	-0.22	2.74	40	7
Base or Rebase Cost per Discharge Quintile #3						
Base or Rebase Year Cost per Discharge (thousand $)	9.62	0.71	8.58	10.87	37	13
Additional RCHD Payments over IPPS (million $)	2.05	1.55	-0.67	5.65	37	13
Base or Rebase Cost per Discharge Quintile #4						
Base or Rebase Year Cost per Discharge (thousand $)	11.97	1.10	10.92	14.25	38	8
Additional RCHD Payments over IPPS (million $)	2.14	1.60	-0.94	5.06	38	8
Base or Rebase Cost per Discharge Quintile #5						
Base or Rebase Year Cost per Discharge (thousand $)	18.25	2.97	14.31	23.43	36	7
Additional RCHD Payments over IPPS (million $)	3.14	2.50	-0.05	10.28	36	7

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For hospitals that continue participation across extensions of the demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges. (4) The same hospital could be in multiple quartiles as base year cost per discharge varied for a hospital over time each time the hospital rebased.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Exhibit E4: Actual Year Medicare Inpatient Acute Care Discharge Summary

Outcome	Mean	Standard Deviation	Min	Max	# of Cost Reports	# of Unique Hospitals
Actual Year Medicare Inpatient Discharge Quintile #1						
Medicare Inpatient Discharges	201.45	126.14	0.00	397.00	38	14
Additional RCHD Payments over IPPS (million $)	1.43	1.10	0.046	4.86	38	14
Actual Year Medicare Inpatient Discharge Quintile #2						
Medicare Inpatient Discharges	467.95	40.30	400.00	529.00	38	13
Additional RCHD Payments over IPPS (million $)	1.27	1.07	-0.94	3.43	38	13
Actual Year Medicare Inpatient Discharge Quintile #3						
Medicare Inpatient Discharges	570.18	37.94	530.00	681.00	38	14
Additional RCHD Payments over IPPS (million $)	1.39	1.24	-0.02	7.40	38	14
Actual Year Medicare Inpatient Discharge Quintile #4						
Medicare Inpatient Discharges	770.84	50.81	690.00	857.00	38	10
Additional RCHD Payments over IPPS (million $)	2.69	1.80	0.09	7.46	38	10
Actual Year Medicare Inpatient Discharge Quintile #5						
Medicare Inpatient Discharges	1031.27	106.78	863.00	1293.00	37	9
Additional RCHD Payments over IPPS (million $)	2.64	2.39	-0.67	10.27	37	9

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For hospitals that continue participation across extensions of the demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges. (4) The same hospital could be in multiple quartiles Medicare inpatient discharges varied for a hospital over time each time the hospital rebased.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Exhibit E5: Actual Year Medicare Inpatient Swing Bed Discharge Summary						
Outcome	Mean	Standard Deviation	Min	Max	# of Cost Reports	# of Unique Hospitals
Actual Year Medicare Inpatient Post-Acute Care Swing Bed Discharge Quintile #1						
Medicare Swing Bed Discharges	0.00	0.00	0.00	0.00	68	19
Additional RCHD Payments over IPPS (million $)	1.47	1.55	-0.94	7.46	38	8
Actual Year Medicare Inpatient Swing Bed Discharge Quintile #2						
Medicare Swing Bed Discharges	12.50	7.03	2.00	23.00	8	5
Additional RCHD Payments over IPPS (million $)	0.88	1.12	-0.38	2.96	8	5
Actual Year Medicare Inpatient Swing Bed Discharge Quintile #3						
Medicare Swing Bed Discharges	43.88	8.95	24.00	57.00	40	11
Additional RCHD Payments over IPPS (million $)	2.28	2.37	-0.05	10.28	40	11
Actual Year Medicare Inpatient Swing Bed Discharge Quintile #4						
Medicare Swing Bed Discharges	93.83	24.97	59.00	132.00	36	15
Additional RCHD Payments over IPPS (million $)	1.77	1.12	-0.02	5.43	36	15
Actual Year Medicare Inpatient Swing Bed Discharge Quintile #5						
Medicare Swing Bed Discharges	182.35	80.65	134.00	638.00	37	10
Additional RCHD Payments over IPPS (million $)	2.53	1.42	0.62	5.65	37	10

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For hospitals that continue participation across extensions of the demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges. (4) The same hospital could be in multiple quartiles Medicare swing bed discharges varied for a hospital over time each time the hospital rebased.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Multivariate Regression Sensitivity Analysis and Robustness Checks

Exhibit E6: Multivariate Regression Analysis of Association Between RCHD Payment Components (expressed in quintiles with quintile 1 as reference group), Market Type, and Additional RCHD Payments over IPPS

Independent Variables: Hospital and Contextual Characteristics	Coefficient (Standard Error)	95% Confidence Interval	p-value
Dependent Variable: Additional RCHD Payments over IPPS (million $)			
RCHD Payment Components			
Quintile 2: Cost per Discharge in Base or Rebase Year (thousand $) (Reference Group: Quintile 1)	0.357 (0.363)	[-0.384 1.598]	0.334
Quintile 3: Cost per Discharge in Base or Rebase Year (thousand $) (Reference Group: Quintile 1)	1.143 (0.481)	[0.162 2.123]	0.024
Quintile 4: Cost per Discharge in Base or Rebase Year (thousand $) (Reference Group: Quintile 1)	1.427 (0.327)	[0.760 2.594]	0.000
Quintile 5: Cost per Discharge in Base or Rebase Year (thousand $) (Reference Group: Quintile 1)	3.254 (0.829)	[1.563 4.945]	0.000
Quintile 2: Medicare Inpatient Acute Care Discharges (Reference Group: Quintile 1)	0.447 (0.397)	[-0.363 1.257]	0.269
Quintile 3: Medicare Inpatient Acute Care Discharges (Reference Group: Quintile 1)	0.901 (0.538)	[-0.195 1.998]	0.104
Quintile 4: Medicare Inpatient Acute Care Discharges (Reference Group: Quintile 1)	2.013 (0.521)	[0.950 3.275]	0.001
Quintile 5: Medicare Inpatient Acute Care Discharges (Reference Group: Quintile 1)	1.895 (0.734)	[0.398 3.392]	0.015
Quintile 2: Medicare Swing Bed Discharges (Reference Group: Quintile 1)	-0.683 (0.723)	[-2.157 6.792]	0.352
Quintile 3: Medicare Swing Bed Discharges (Reference Group: Quintile 1)	1.329 (0.558)	[0.191 2.467]	0.024
Quintile 4: Medicare Swing Bed Discharges (Reference Group: Quintile 1)	1.651 (0.396)	[0.844 2.458]	0.000
Quintile 5: Medicare Swing Bed Discharges (Reference Group: Quintile 1)	1.675 (0.544)	[0.565 2.785]	0.004
Market Typology			
Isolated Hospital (Reference Group: Competitive Hospital)	0.267 (0.462)	[-0.675 1.213]	0.567
Frontier Hospital (Reference Group: Competitive Hospital)	0.273 (0.680)	[-1.114 1.663]	0.691
N (Total Hospital Cost Reports)	189		
Unique hospitals	32		
Adjusted R squared	0.555		

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For the 4 hospital year observations (2 hospitals) missing base year inpatient acute care discharge information but with non-zero base year costs for inpatient acute care services, we imputed the base year

discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (4) For the 21 hospital year observations (5 hospitals) missing base year swing bed discharge information but with non-zero base year costs for swing bed services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (5) For hospitals that continue participation across extensions of the demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges. (6) The regression also included year fixed effects to account for contemporaneous changes that affect all hospitals over time. (7) The standard errors were robust clustered at the hospital level as 28 hospitals had more than 1 year of cost report data. (8) The base or rebase year cost per discharge for quintile 1 ranged from $3,730 to $7,880, quintile 2 ranged from $7,980 to $8,520, quintile 3 ranged from $8,560 to $10,870, quintile 4 ranged from $10,920 to $14,250, and quintile 5 ranged from $14,310 to $23,430. (9) Medicare inpatient discharges for quintile 1 ranged from 0 to 397, quintile 2 ranged from 400 to 529, quintile 3 ranged from 530 to 681, quintile 4 ranged from 690 to 857, and quintile 5 ranged from 863 to 1,293. (10) Medicare swing bed discharges for quintile 1 was 0, quintile 2 ranged from 2 to 23, quintile 3 ranged from 24to 57, quintile 4 ranged from 59 to 132, and quintile 5 ranged from 134 to 638.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Exhibit E7: Multivariate Regression Analysis of Association Between Cost per Discharge and Market Type, and Additional RCHD Payments over IPPS			
Dependent Variable: *Additional RCHD Payments over IPPS (million $)*			
Independent Variables: Hospital and Contextual Characteristics	**Coefficient (Standard Error)**	**95% Confidence Interval**	**p-value**
RCHD Payment Components			
Cost per Discharge in Base or Rebase Year (thousand $)	0.198 (0.06)	[0.039, 0.36]	0.016
Market Typology			
Isolated Hospital (reference group: Competitive Hospital)	-1.141 (0.431)	[-2.120, -0.163]	0.024
Frontier Hospital (reference group: Competitive Hospital)	-0.213 (0.699)	[-2.145, 1.719]	0.823
N (Total Hospital Cost Reports)	189		
Unique hospitals	32		
Adjusted R squared	0.2998		

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For the 4 hospital year observations (2 hospitals) missing base year inpatient acute care discharge information but with non-zero base year costs for inpatient acute care services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (4) For the 21 hospital year observations (5 hospitals) missing base year swing bed discharge information but with non-zero base year costs for swing bed services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (5) For hospitals that continue participation across extensions of the demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges. (6) The regression also included year fixed effects to account for contemporaneous changes that affect all hospitals over time. (7) The standard errors were robust clustered at the hospital level as 28 hospitals had more than 1 year of cost report data.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Exhibit E8: Multivariate Regression Analysis of Association Between RCHD Payment Components, Market Type, Contextual Characteristics and Additional RCHD Payments over IPPS

Dependent Variable: Additional RCHD Payments over IPPS (million $)			
Independent Variables: Hospital and Contextual Characteristics	**Coefficient (Standard Error)**	**95% Confidence Interval**	**p-value**
RCHD Payment Components			
Cost per Discharge in Base or Rebase Year (thousand $)	0.323 (0.086)	[0.147, 0.498]	0.001
Medicare Inpatient Acute Care Discharges	0.003 (0.001)	[0.001, 0.004]	0.000
Medicare Swing Bed Discharges	0.007 (0.003)	[0.001, 0.012]	0.015
Market Typology			
Isolated Hospital (reference group: Competitive Hospital)	0.792 (0.612)	[-0.455, 2.039]	0.205
Frontier Hospital (reference group: Competitive Hospital)	0.974 (0.628)	[-0.306, 2.255]	0.131
Contextual Characteristics			
Hospital System	-0.593 (0.444)	[-1.498, 0.311]	0.191
Not-for-profit (reference group: for profit)	-0.399 (0.552)	[-1.526, 0.728]	0.475
Government (reference group: for profit)	0.096 (0.620)	[-1.169, 1.361]	0.878
Percent over 65 Years	-1.192 (4.672)	[-10.722, 8.337]	0.8
High School Education or Less	-0.026 (0.024)	[-0.075, 0.023]	0.289
Percent White Non-Hispanic	1.207 (1.170)	[-1.178, 3.593]	0.31
Percent of Residents Below 150% over Poverty Line	-0.018 (0.049)	[-0.118, 0.081]	0.71
Unemployment Rate	0.068 (0.067)	[-0.068, 0.205]	0.316
Median Household Income ($)	0.000 (0.000)	[-0.001, 0.001]	0.692
Median Home Value (thousand $)	-0.015 (0.006)	[-0.027, -0.002]	0.023
Medicaid Expansion State Under ACA	-0.248 (0.445)	[-1.155, 0.658]	0.58
N (Total Hospital Cost Reports)		189	
Unique hospitals		32	
Adjusted R squared		0.643	

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For the 4 hospital year observations (2 hospitals) missing base year inpatient acute care discharge information but with non-zero base year costs for inpatient acute care services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (4) For the 21 hospital year observations (5 hospitals) missing base year swing bed discharge information but with non-zero base year costs for swing bed services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (5) For hospitals that continue participation across extensions of the

demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges. (6) The regression also included year fixed effects to account for contemporaneous changes that affect all hospitals over time. (7) The standard errors were robust clustered at the hospital level as 28 hospitals had more than 1 year of cost report data.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Exhibit E9: Multivariate Regression Analysis of Association Between RCHD Payment Components, Market Type, and Additional RCHD Payments over IPPS (including Hospital Fixed Effects)

Dependent Variable: Additional RCHD Payments over IPPS (million $)			
Independent Variables: Hospital and Contextual Characteristics	**Coefficient (Standard Error)**	**95% Confidence Interval**	**p-value**
RCHD Payment Components			
Cost per Discharge in Base or Rebase Year (thousand $)	0.302 (0.07)	[0.172, 0.432]	0.000
Medicare Inpatient Acute Care Discharges	0.003 (0.00)	[0.001, 0.004]	0.000
Medicare Swing Bed Discharges	0.000 (0.00)	[-0.001, 0.001]	0.976
Market Typology			
Isolated Hospital (reference group: Competitive Hospital)	0.268 (0.71)	[-1.142, 1.678]	0.708
Frontier Hospital (reference group: Competitive Hospital)	0.372 (0.60)	[-0.809, 1.553]	0.535
N (Total Hospital Cost Reports) Unique hospitals Adjusted R squared	185 32 0.878		

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For the 4 hospital year observations (2 hospitals) missing base year inpatient acute care discharge information but with non-zero base year costs for inpatient acute care services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (4) For the 21 hospital year observations (5 hospitals) missing base year swing bed discharge information but with non-zero base year costs for swing bed services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (5) For hospitals that continue participation across extensions of the demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges. (6) The regression model also included year fixed effects to account for contemporaneous changes that affect all hospitals over time and unique hospital fixed effects to account for time-invariant unobserved differences between hospitals. (7) The standard errors are robust, but not clustered at the unique hospital level.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Exhibit E10: Multivariate Regression Analysis of Association Between RCHD Payment Components, Market Type, and Additional RCHD Payments over IPPS (non-clustered robust standard errors)

Dependent Variable: Additional RCHD Payments over IPPS (million $)			
Independent Variables: Hospital and Contextual Characteristics	**Coefficient (Standard Error)**	**95% Confidence Interval**	**p-value**
RCHD Payment Components			
Cost per Discharge in Base or Rebase Year (thousand $)	0.275 (0.03)	[0.217, 0.332]	0.000
Medicare Inpatient Acute Care Discharges	0.003 (0.00)	[0.002, 0.003]	0.000
Medicare Swing Bed Discharges	0.007 (0.00)	[0.003, 0.011]	0.002
Market Typology			
Isolated Hospital (reference group: Competitive Hospital)	-0.426 (0.27)	[-0.957, 0.106]	0.116
Frontier Hospital (reference group: Competitive Hospital)	-0.037 (0.36)	[-0.742, 0.669]	0.918
N (Total Hospital Cost Reports)	189		
Unique hospitals	32		
Adjusted R squared	0.555		

Notes: (1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing. (3) For the 4 hospital year observations (2 hospitals) missing base year inpatient acute care discharge information but with non-zero base year costs for inpatient acute care services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (4) For the 21 hospital year observations (5 hospitals) missing base year swing bed discharge information but with non-zero base year costs for swing bed services, we imputed the base year discharge information based on the hospital-specific average acute care inpatient discharges over all other years where data is available. A dummy variable was included in the regression to identify the observations. (5) For hospitals that continue participation across extensions of the demonstration, the cost per discharge for inpatient acute care and swing beds change to the cost per discharge in the rebase year when they are reimbursed on reasonable actual costs and their target amounts for inpatient acute care swing beds following the rebase year are based on the rebase year's inpatient acute care or swing bed cost per discharges. (6) The regression model also included year fixed effects to account for contemporaneous changes that affect all hospitals over time. (7) The standard errors are robust, but not clustered at the unique hospital level.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Additional RCHD Payment over IPPS by fiscal year

Exhibit E11: Additional RCHD Payments over IPPS by Fiscal Years FY 2005-2017 (with additional details)													
Measure	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
# of Demonstration Hospitals	13	9	9	9	10	9	17	23	22	21	18	12	17
# of Demonstration Hospitals Joining During Initial MMA Authorization	13	9	9	9	10	9	7	7	7	7	5	1	4
# of Demonstration Hospitals Joining During ACA Extension	0	0	0	0	0	0	10	16	15	14	13	11	13
Total RCHD Payments over IPPS plus SNF PPS (million $)	19.44	16.69	14.90	17.27	14.33	16.82	31.21	39.29	42.83	43.81	39.67	17.34	41.58
Total Percentage Increase over IPPS Payment (million $)	33.4%	37.5%	31.6%	37.4%	29.3%	35.5%	30.1%	30.1%	37.8%	39.0%	36.6%	29.4%	38.7%
Additional RCHD Payments over IPPS plus SNF PPS per Hospital (million $)	1.50	1.85	1.66	1.92	1.43	1.87	1.84	1.71	1.95	2.09	2.20	1.44	2.45
Per Discharge Additional RCHD Payments over IPPS plus SNF PPS (thousand $)	2.14	2.24	1.97	2.35	2.95	4.19	2.93	3.27	3.72	4.01	3.63	2.53	4.05
# of Hospitals with Swing Bed Discharges	10	6	6	6	6	4	12	16	15	13	13	9	14

Notes: *(1) Data from 189 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing.*

Source: *Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010*

Participant Hospitals Active in FY 2017: Additional RCHD Payment over IPPS and Additional RCHD Swing Bed Payment over SNF PPS by fiscal year

Exhibit E12: Additional RCHD Payments over IPPS by Fiscal Years FY 2005-2010 (for hospitals active in FY 2017)							
Hospital	Cohort	Year 1 FY 2005	Year 2 FY 2006	Year 3 FY 2007	Year 4 FY 2008	Year 5 FY 2009	Year 6 FY 2010
Bartlett	MMA	$509,580^B 9%	$1,155,483 24%	$698,874 12%	$639,096 12%	$713,917 13%	$3,390,465$^{RB, A}$ 54%
Brookings	MMA	–	–	–	–	$1,407,393$^{B, A}$ 41%	$1,490,502 45%
Central Peninsula	MMA	$3,152,500$^{B, A}$ 48%	$3,868,839 61%	$3,673,279 49%	$4,070,319 48%	$3,957,451 48%	$5,149,837$^{RB, A}$ 58%
Columbus	MMA	$5,237,279$^{B, A}$ 80%	$5,292,832$^{, A}$ 78%	$4,818,087$^{, A}$ 69%	$5,433,218$^{. A}$ 84%	$5,649,574 79%	$3,527,262$^{RB, A}$ 36%
Total Percentage Increase Over IPPS Payment	MMA	48%	57%	45%	50%	48%	48%
Average Percentage Increase over IPPS across Demonstration Hospitals	MMA	46%	54%	43%	48%	45%	48%

Notes: (1) Data from 127 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) These cost reports pertain to the 17 hospitals that were active participants in FY 2017. (2) Superscript B refers to base year and RB refers to rebase year. (3) Superscript A denotes that the hospital is paid on actual costs. Observations missing the superscript A denotes that the hospital was paid on target costs. (4) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010

Exhibit E13: Additional RCHD Payments over IPPS by Fiscal Years FY 2011-2015 (for hospitals active in FY 2017)

Hospital	Cohort	Year 7 FY 2011	Year 8 FY 2012	Year 9 FY 2013	Year 10 FY 2014	Year 11 FY 2015
Brookings	MMA	$1,433,079[RB, A] 38%	$1,574,769 40%	$1,625,983 44%	$1,565,794 44%	$1,796,472, A 47%
Columbus	MMA	$2,443,970, A 25%	$2,892,929, A 28%	$2,891,929, A 30%	$3,422,704, A 36%	$1,887,057[RB, A] 15%
Central Peninsula	MMA	$5,591,607, A 55%	$6,004,579, A 62%	$7,459,477, A 63%	$7,464,519 60%	$7,231,009[RB, A] 46%
Bartlett	MMA	$3,355,169 57%	$3,253,468, A 56%	$3,007,225 59%	$3,433,231 60%	$4,856,661[RB, A] 60%
Grinnell	ACA	–	$643,854[B, A] 13%	$1,221,025, A 27%	$1,335,309, A 36%	$1,570,208 42%
Skiff	ACA	$2,321,587[B, A] 39%	$2,735,859 49%	$2,365,191 47%	$2,081,021 42%	$1,941,391, A 46%
Delta	ACA	–	$1,957,699[B, A] 25%	$1,906,858, A 32%	$1,952,793, A 29%	$2,011,193, A 32%
Maine Coast	ACA	$2,146,748[B, A] 20%	$972,105, A 9%	$1,930,329, A 21%	$2,127,418, A 24%	$2,462,978 25%
Inland	ACA	$1,180,007[B, A] 21%	$797,370, A 14%	$357,363, A 6%	$1,206,202, A 20%	*
Mercy Fort Scott	ACA	$865,179[B, A] 16%	$1,721,303 39%	$1,662,370, A 40%	$1,223,866, A 30%	$1,349,245, A 43%
Lakes	ACA	$1,592,598[B, A] 44%	$2,553,578 73%	$2,196,186 67%	$2,220,056 68%	$2,273,583, A 67%
Yampa Valley	ACA	–	$599,919[B, A] 8%	$1,521,533, A 25%	$675,848, A 9%	-$49,637, A -1%
Marion	ACA	–	$1,510,206[B, A] 66%	$880,613, A 16%	$2,341,644 46%	$1,731,315, A 33%
St. Anthony Regional	ACA	$3,125,927[B, A] 40%	$4,117,184 61%	$4,147,126 68%	$4,075,060 65%	$3,971,485 63%
Geary	ACA	$1,699,742[B, A] 41%	$1,892,556 53%	$1,844,786 53%	$2,004,340 62%	$2,125,801 69%
Alta Vista	ACA	$736,443[B, A] 12%	$85,311 1%	$497,345 10%	$369,874 8%	-$107,522 -2%
Bob Wilson	ACA	–	$1,310,993[B, A] 124%	$1,196,924 140%	$1,885,089 124%	$2,100,051, A 130%

Total Percentage Increase Over IPPS Payment	MMA and ACA	33%	35%	39%	41%	37%
Average Percentage Increase over IPPS across Demonstration Hospitals	MMA and ACA	34%	43%	44%	45%	45%

Notes: (1) Data from 127 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) These cost reports pertain to the 17 hospitals that were active participants in FY 2017. (2) Superscript B refers to base year and RB refers to rebase year. (3) Superscript A denotes that the hospital is paid on actual costs. Observations missing the superscript A denotes that the hospital was paid on target costs. (4) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing..

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.

Exhibit E14: Additional RCHD Payments over IPPS by Fiscal Years FY 2016-2017 (for hospitals active in FY 2017)

Hospital	Cohort	Year Twelve FY 2016	Year Thirteen FY 2017
Columbus	MMA	*	$2,005,045 19%
Central Peninsula	MMA	*	$10,275,121 65%
Bartlett	MMA	*	$7,402,087 90%
Brookings	MMA	$1,007,226[RB, A] 24%	$355,392 8%
Marion	ACA	$1,548,272[, A] 35%	$2,008,526[RB, A] 48%
St. Anthony Regional	ACA	$5,059,644[RB, A] 77%	$4,822,774 78%
Inland	ACA	$462,881[RB, A] 7%	-$937,907 -14%
Lakes	ACA	$1,315,318[RB, A] 29%	$1,845,453 44%
Maine Coast	ACA	*[RB, A]	$2,781,851 24%
Yampa Valley	ACA	$946,843[, A] 12%	$46,111[RB, A] 0%
Bob Wilson	ACA	*[RB, A]	$1,868,097 177%
Skiff	ACA	$1,315,162[RB, A] 29%	$1,459,543 48%
Geary	ACA	$3,083,724[RB, A] 93%	$2,963,939 107%
Delta	ACA	*[RB, A]	$2,337,928 32%
Mercy Fort Scott	ACA	$935,605[RB, A] 31%	$533,695 28%
Alta Vista	ACA	-$453,852[RB, A] -8%	-$382,440 -7%
Grinnell	ACA	$1,683,185 54%	$2,190,433[RB, A] 55%
Total Percentage Increase Over IPPS Payment	MMA and ACA	32%	39%
Average Percentage Increase over IPPS Payment across Demonstration Hospitals	MMA and ACA	35%	47%

Notes: (1) Data from 127 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) These cost reports pertain to the 17 hospitals that were active participants in FY 2017. (2) Superscript B refers to base year and RB refers to rebase year. (3) Superscript A denotes that the hospital is paid on actual costs. Observations missing the superscript A denotes that the hospital was paid on target costs. (4) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.

Exhibit E15: Additional RCHD Swing Bed Payment over SNF PPS by Fiscal Year FY 2005-2010 (for hospitals active in FY 2017)

Hospital	Cohort	Year 1 FY 2005	Year 2 FY 2006	Year 3 FY 2007	Year 4 FY 2008	Year 5 FY 2009	Year 6 FY 2010
Brookings	MMA	–	–	–	–	$730,578 [B, A] 258%	$860,649, [A] 250%
Central Peninsula	MMA	$715,972[B, A] 362%	$689,162 431%	$801,234 383%	$791,322 470%	$731,209 442%	$534,695[RB, A] 584%
Columbus	MMA	$1,235,891[B, A] 1,012%	$1,370,350 837%	$1,337,247, [A] 782%	$1,325,338, [A] 869%	$1,427,428, [A] 935%	$1,361,784[RB, A] 1,155%
Total Percentage Increase Over SNF PPS	MMA	610%	636%	563%	659%	480%	497%
Average Percentage Increase over SNF PPS	MMA	687%	634%	583%	669%	545%	663%

Notes: (1) Data from 99 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) These cost reports pertain to the 14 hospitals that were active participants in FY 2017 with non-zero swing bed discharges with information on the type of cost payment (actual or target). (2) Superscript B refers to base year and RB refers to rebase year. (3) Superscript A denotes that the hospital is paid on actual costs. Observations missing the superscript A denotes that the hospital was paid on target costs. (4) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.

Exhibit E16: Additional RCHD Swing Bed Payments above SNF PPS by Fiscal Year FY 2011-2015 (for hospitals active in FY 2017)

Hospital	Cohort	Year 7 FY 2011	Year 8 FY 2012	Year 9 FY 2013	Year 10 FY 2014	Year 11 FY 2015
Central Peninsula	MMA	$964,281$^{, A}$ 614%	$1,031,793$^{, A}$ 747%	$961,230 460%	–	$1,315,646$^{RB, A}$ 690%
Columbus	MMA	$1,421,987 1017%	$1,519,023 1049%	$1,706,231 994%	$1,949,682 830%	$2,470,158$^{RB, A}$ 525%
Brookings	MMA	$726,615$^{ RB, A}$ 229%	$838,319 244%	$1,040,811 273%	$918,671 185%	$1,019,128 233%
Skiff	ACA	$1,029,178$^{ B, A}$ 287%	$1,198,323 332%	$890,771 315%	$681,262$^{, A}$ 374%	$839,271$^{, A}$ 516%
St. Anthony Regional	ACA	$1,163,590$^{ B, A}$ 277%	$1,320,528 232%	$1,596,158 276%	$1,454,869 296%	$1,344,884 275%
Alta Vista	ACA	$133,946$^{ B, A}$ 315%	$44,179 280%	–	–	–
Grinnell	ACA	–	$346,559$^{ B, A}$ 355%	$373,404$^{, A}$ 331%	$340,627 406%	$420,338 419%
Yampa Valley	ACA	–	$850,060$^{ B, A}$ 437%	$728,911$^{, A}$ 454%	$558,552 362%	$287,183$^{, A}$ 622%
Marion	ACA	–	$925,710$^{ B, A}$ 200%	$845,693 38%	$1,949,665$^{, A}$ 148%	$1,761,972$^{, A}$ 113%
Maine Coast	ACA	$992,068$^{ B, A}$ 453%	$740,392$^{, A}$ 431%	$1,050,828 382%	$1,055,589 412%	$821,295 405%
Mercy Fort Scott	ACA	$811,163$^{ B, A}$ 287%	$769,541 269%	$699,027$^{, A}$ 285%	$398,258 60%	$517,033 316%
Geary	ACA	$394,848$^{ B, A}$ 303%	$343,992$^{, A}$ 442%	$385,721 302%	$354,587$^{, A}$ 343%	-$10,901 -9%
Lakes	ACA	$552,832$^{ B, A}$ 477%	$736,241$^{, A}$ 463%	$454,245$^{, A}$ 493%	$400,789 403%	$277,212 314%
Bob Wilson	ACA	–	$1,046,941$^{ B A}$ 687%	$789,461$^{, A}$ 912%	$1,125,913$^{, A}$ 768%	$1,474,019$^{, A}$ 806%
Total Percentage Increase Over SNF PPS		375%	369%	232%	264%	298%
Average Percentage Increase over SNF PPS		426%	441%	424%	382%	402%

Notes: (1) Data from 99 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) These cost reports pertain to the 14 hospitals that were active participants in FY 2017 with non-zero swing bed discharges with information on the type of cost payment (actual or target). (2) Superscript B refers to base year and RB refers to rebase year. (3) Superscript A denotes that the hospital is paid on actual costs. Observations missing the superscript A denotes that the hospital was paid on target costs. (4) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.

Exhibit E17: Additional RCHD Swing Bed Payments above SNF PPS by Fiscal Year FY 2016-2017 (for hospitals active in FY 2017)

Hospital	Cohort	Year Twelve FY 2016	Year Thirteen FY 2017
Columbus	MMA	*	$1,822,779 451%
Brookings	MMA	$866,265[RB, A] 242%	$805,418 255%
Central Peninsula	MMA	*	$1,063,279 461%
Grinnell	ACA	$450,649,[A] 396%	$558,459 [RB, A] 447%
Maine Coast	ACA	* [RB, A]	$992,395 429%
St. Anthony Regional	ACA	$2,022,713[RB, A] 382%	$1,834,937 432%
Bob Wilson	ACA	* [RB, A]	$1,285,656 817%
Skiff	ACA	$771,398 [RB, A] 533%	$552,324 547%
Lakes	ACA	$376,807 [RB, A] 596%	$176,758 504%
Marion	ACA	$1,330,288,[A] 117%	$2,168,530[RB, A] 136%
Mercy Fort Scott	ACA	$617,140 [RB, A] 339%	$342,969 301%
Yampa Valley	ACA	$243,115 462%	$214,430 [RB, A] 917%
Geary	ACA	$314,738 [RB, A] 377%	$177,905 0%
Alta Vista	ACA	[RB, A]	$40,682 309%
Total Percentage Increase Over SNF PPS	MMA and ACA	262%	319%
Average Percentage Increase over SNF PPS	MMA and ACA	383%	462%

Notes: (1) Data from 99 settled cost reports was used for this this analysis. Eight cost reports were excluded from this analysis as they were missing cost report data. Three cost reports were excluded because they did not cover 12 months. (2) These cost reports pertain to the 14 hospitals that were active participants in FY 2017 with non-zero swing bed discharges with information on the type of cost payment (actual or target). (2) Superscript B refers to base year and RB refers to rebase year. (3) Superscript A denotes that the hospital is paid on actual costs. Observations missing the superscript A denotes that the hospital was paid on target costs. (4) The analysis included at least 1 cost report from 32 unique RCHD hospitals. No cost reports from St. Joseph's hospital were included in the analysis as the only cost report for the period covering 7/1/2008 to 6/30/2009 (FY 2008) was missing.

Source: Worksheet E Part A or RCHD Summary Worksheet in Hospital 2552-10 form for cost reports after 2010 and Hospital 2552-96 form before May 1, 2010.

APPENDIX F: DEBT-SERVICE COVERAGE RATIO RESULTS

We do not present results for the outcome debt-service coverage ratio in the body of the report due to data quality issues with this variable, particularly missing observations and volatile data. However, we report the results for this variable in this appendix because this outcome is a theoretically important outcome of the demonstration. However, due to the severe data quality issues for this outcome, the results are unreliable, and we do not recommend to attempt to interpret the results of the demonstration on this outcome.

Among RCHD hospitals, 27 percent of observations for this variable are missing. Between 2002-2017, RCHD hospitals are missing this variable for an average of 6 out of 16 years. Close to 30 percent of RCHD hospitals are missing this variable for 10 or more years out of 16. The data for this variable is also extremely volatile; the coefficient of variation for this variable[104] is over 30,000 percent.

In the exhibits below we present the results for a winsorized version of this variable; wherein values below the 1st percentile are replaced with the 1st percentile value and values above the 99th percentile are replaced with the 99th percentile value. Nevertheless, data quality concerns, as evidenced by a high ratio of standard deviations to means in Exhibit F1 below, remain.

As shown in Exhibit F1, there was no statistically significant difference in the debt-service coverage ratio between RCHD hospitals and eligible non-participant hospitals in the baseline period. During the demonstration period, RCHD hospitals had a lower debt-service coverage ratio (10 vs. 35), and this difference was statistically significant. When stratified by cohort, MMA hospitals and ACA hospitals each had statistically significantly lower debt-service coverage ratios than their eligible non-participant hospitals counterparts.

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[104] Coefficient of Variation or CV is the ratio of standard deviation to mean expressed in percentage terms.

Exhibit F1: Debt-Service Coverage Ratio, RCHD Hospitals Compared to Eligible Non-Participant Hospitals

			Mean	SD	Difference	N_h	N_{obs}
Debt-Service Coverage Ratio							
MMA	Baseline	RCHD	16	24	-2	13	35
		Eligible Non-Participants	18	115		787	1,861
	Demonstration	RCHD	19	72	-16*	13	70
		Eligible Non-Participants	35	165		601	3,526
ACA	Baseline	RCHD	53	192	15	16	48
		Eligible Non-Participants	38	176		416	1,135
	Demonstration	RCHD	1	30	-38***	13	37
		Eligible Non-Participants	39	178		336	828
MMA & ACA	Baseline	RCHD	35	139	11	11	67
		Eligible Non-Participants	24	137		386	1,733
	Demonstration	RCHD	10	56	-25***	24	137
		Eligible Non-Participants	35	165		601	3,526

Notes: SD denotes standard deviation, N_h denotes number of hospitals, and N_{obs} denotes number of hospital-years. Difference denotes the difference in means between participants and non-participants. All financial indicators were calculated from HCRIS data using the technical specifications described in Exhibit 3.1. Mt. Edgecumbe hospital is not included in exhibits presenting hospital-specific data because of missing data. Due to extreme values, the values for debt-service coverage ratio were winsorized such that values below –1 are replaced with –1 and values above 1 are replaced with 1. Winsorization affects 1% of observations for RCHD participants and around 1.56% of observations for non-participants. Means for aggregate periods are the simple average of year-specific means.
*** p-value < 0.01; ** 0.01 ≤ p-value < 0.05; * 0.05 ≤ p-value < 0.10.
Source: HCRIS, FY 2002–2017.

In Exhibit F2 below we enclose impact estimates for this outcome from the pre-post model and the DID model. DID model results are presented for the full sample and for each of the sub-groups. The demonstration does not have an impact on hospitals' debt-service coverage ratio as per most of the specifications estimated and presented below. For two sub-groups: the MMA only cohort and for hospitals in isolated areas, regression results show that the demonstration negatively affected hospitals' debt-service coverage ratio. Given the very poor data quality, we believe that this outcome is unreliable, and thus do not attempt to interpret the impacts of the demonstration on this outcome.

Exhibit F2: Impact Estimates for Debt-Service Coverage Ratio Outcome

	Pre-Post	Full Sample DID	MMA Cohort Hospitals DID	ACA Cohort Hospitals DID	Competitive Hospitals DID	Frontier Hospitals DID	Isolated Hospitals DID
Average Impact Estimate	-7.71	-28.21	-29.28**	-59.30	-9.77	9.68	-166.77**
90% Confidence Interval	(-28.57,13.16)	(-66.92,10.50)	(-52.98,-5.58)	(-129.83,11.23)	(-25.41,5.86)	(-73.57,92.92)	(-288.55,-44.99)
Standard Error	(12.67)	(23.50)	(14.39)	(42.82)	(9.49)	(50.53)	(73.93)
Regression *p*-value	[0.55]	[0.23]	[0.04]	[0.17]	[0.30]	[0.85]	[0.03]
Baseline Mean for RCHD Hospitals	19.53	19.53	10.64	26.20	7.38	44.83	14.12
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-39.47	-144	-275	-226	-132	22	-1181
Sample Size (Hospital-Years)	212	6,494	4,262	2,232	5,380	672	436
Number of RCHD Hospitals	25	25	12	13	15	7	3
Number of Comparison Hospitals	N/A	484	398	323	406	57	40

Notes: Standard errors, clustered at the hospital level, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. The comparison group was defined using an entropy balancing method.

APPENDIX G: TOPIC AREA 3 EXHIBITS

Matching Variables & Diagnostics

Exhibit G1: Entropy Balancing Variables

|	Entropy Balancing Variables
MMA Cohort - Overall Model	Total profit margin in 2002, total profit margin in 2003, total profit margin in 2004, Medicare inpatient margin in 2002, Medicare inpatient margin in 2003, Medicare inpatient margin in 2004, indicator for competitive hospital, indicator for frontier hospital, poverty rate, percentage of county over 65 years old, unemployment rate, indicator for hospital is a non-profit, indicator for hospital is government-run, indicator for hospital is in a system, average daily census acute care beds, hospital case mix index, number of Medicare discharges, total discharges, percentage white in county
ACA Cohort – Overall Model	Total profit margin in 2009, total profit margin in 2010, total profit margin in 2011, Medicare inpatient margin in 2009, Medicare inpatient margin in 2010, Medicare inpatient margin in 2011, indicator for competitive hospital, indicator for frontier hospital, poverty rate, percentage of county over 65 years old, unemployment rate, indicator for ever expanded Medicaid under ACA, percentage white in county
CCA Cohort – Overall Model (included in sensitivity check only)	Total profit margin in 2015, total profit margin in 2016, total profit margin in 2017, Medicare inpatient margin in 2015, Medicare inpatient margin in 2016, Medicare inpatient margin in 2017, indicator for competitive hospital, indicator for frontier hospital, poverty rate, indicator for ever expanded Medicaid under ACA, percentage white in county
MMA Cohort – Competitive Hospitals Subgroup	Total profit margin in 2002, total profit margin in 2003, total profit margin in 2004, Medicare inpatient margin in 2002, Medicare inpatient margin in 2003, Medicare inpatient margin in 2004
ACA Cohort – Competitive Hospitals Subgroup	Total profit margin in 2009, total profit margin in 2010, total profit margin in 2011, Medicare inpatient margin in 2009, Medicare inpatient margin in 2010, Medicare inpatient margin in 2011
MMA Cohort – Frontier Hospitals Subgroup	Total profit margin in 2002, total profit margin in 2003, total profit margin in 2004, percentage of county over 65 years old, indicator for hospital is a non-profit, indicator for hospital is in a system, percentage white in county
ACA Cohort – Frontier Hospitals Subgroup	Total profit margin in 2009, total profit margin in 2010, total profit margin in 2011, indicator for hospital is in a system
MMA Cohort – Isolated Hospitals Subgroup	Medicare inpatient margin in 2002, Medicare inpatient margin in 2003, Medicare inpatient margin in 2004, indicator for hospital is a non-profit
ACA Cohort – Isolated Hospitals Subgroup	Poverty rate, Percentage white in county

Exhibit G2: Balance Statistics - All Cohorts and Hospitals of all Market Typologies						
	Cohort	RCHD Group Mean	Pre-Balancing Comparison Group Mean	Pre-Balancing Standardized Difference	Post-Balancing Comparison Group Mean	Post-Balancing Standardized Difference
Total Profit Margin in 2002	MMA	7.28	1.82	45.18	7.29	-0.09
Total Profit Margin in 2003	MMA	3.42	1.74	23.29	3.42	-0.04
Total Profit Margin in 2004	MMA	2.53	2.26	5.19	2.53	-0.11
Medicare Inpatient Margin in 2002	MMA	-11.74	5.00	-90.29	-11.74	-0.01
Medicare Inpatient Margin in 2003	MMA	-20.10	4.38	-197.91	-20.10	0.08
Medicare Inpatient Margin in 2004	MMA	-21.07	5.49	-156.93	-21.07	-0.06
Competitive Hospital	MMA	0.38	0.81	-83.84	0.38	-0.07
Frontier Hospital	MMA	0.46	0.12	65.67	0.46	0.05
Poverty Rate	MMA	22.06	28.82	-106.83	22.06	-0.04
Percentage of County over 65 years old	MMA	0.14	0.15	-18.12	0.14	-0.01
Unemployment Rate	MMA	6.20	6.67	-15.17	6.21	-0.05
Hospital is Non-Profit	MMA	0.77	0.42	80.67	0.77	0.10
Hospital is Government-Run	MMA	0.23	0.41	-41.56	0.23	0.03
Hospital is in a Hospital System	MMA	0.54	0.64	-19.59	0.54	-0.05
Average Daily Census Acute Care Beds	MMA	14.97	15.28	-4.10	14.96	0.11
Hospital Case Mix Index	MMA	1.12	1.05	60.03	1.12	-0.15
Number of Medicare Discharges	MMA	713.74	812.91	-28.59	713.37	0.11
Total Discharges	MMA	1711.38	1658.09	6.41	1710.51	0.10
Percentage White in County	MMA	0.86	0.78	49.44	0.86	-0.03
Total Profit Margin in 2009	ACA	5.37	0.44	37.28	5.36	0.04
Total Profit Margin in 2010	ACA	1.78	0.54	16.49	1.78	-0.02
Total Profit Margin in 2011	ACA	2.36	2.17	2.81	2.36	-0.01
Medicare Inpatient Margin in 2009	ACA	-18.95	-1.25	-137.62	-18.94	-0.07
Medicare Inpatient Margin in 2010	ACA	-17.66	0.83	-135.57	-17.65	-0.10
Medicare Inpatient Margin in 2011	ACA	-4.82	0.54	-33.97	-4.82	-0.01

Exhibit G2: Balance Statistics - All Cohorts and Hospitals of all Market Typologies						
	Cohort	RCHD Group Mean	Pre-Balancing Comparison Group Mean	Pre-Balancing Standardized Difference	Post-Balancing Comparison Group Mean	Post-Balancing Standardized Difference
Competitive Hospital	ACA	0.75	0.82	-16.19	0.75	-0.01
Frontier Hospital	ACA	0.19	0.12	17.37	0.19	0.02
Poverty Rate	ACA	25.58	31.09	-66.89	25.59	-0.07
Percentage of County over 65 years old	ACA	0.16	0.16	0.59	0.16	0.04
Unemployment Rate	ACA	7.52	9.41	-79.08	7.53	-0.06
Ever Expanded Medicaid under ACA	ACA	0.69	0.42	55.72	0.69	0.09
Percentage White in County	ACA	0.82	0.75	34.05	0.82	0.11

Exhibit G3: Baseline Outcome Trend Graphs

Baseline Hospital Margins: Balanced and Unbalanced

Legend: RCHD Participants, Comparison Group

Medicare Inpatient Margin- Balanced — values: -15.7%, -12.1%

Medicare Inpatient Margin- Unbalanced — values: 2.1%, 3.2%, -15.7%, -12.1%

Medicare Combined Margin- Balanced — values: -13.0%, -11.5%, -15.9%, -14.9%

Medicare Combined Margin- Unbalanced — values: 0.1%, 0.3%, -15.9%, -14.9%

Total Profit Margin- Balanced — values: 6.2%, 2.4%

Total Profit Margin- Unbalanced — values: 6.2%, 2.4%, 1.2%, 2.2%

Operating Margin- Balanced — values: 1.0%, 0.3%, 0.2%, -3.4%

Operating Margin- Unbalanced — values: 1.0%, 0.2%, -4.2%, -4.3%

Baseline Financial Indicators: Balanced and Unbalanced

Legend: ■ RCHD Participants ■ Comparison Group

Days Cash on Hand- Balanced

RCHD Participants: 108 (year -2), 101 (year 0)
Comparison Group: 79 (year -2), 76 (year 0)
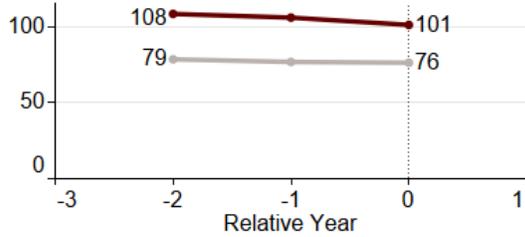
Days Cash on Hand- Unbalanced

RCHD Participants: 108 (year -2), 101 (year 0)
Comparison Group: 90 (year -2), 91 (year 0)
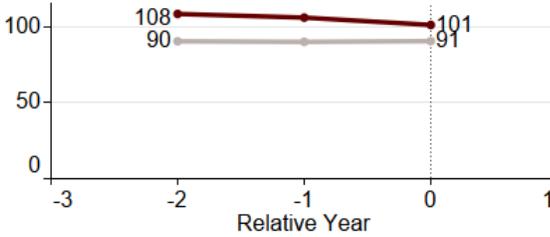
Long-Term Debt-to-Capitalization- Balanced

Comparison Group: 31.9% (year -2), 29.6% (year 0)
RCHD Participants: 24.9% (year -2), 28.3% (year 0)
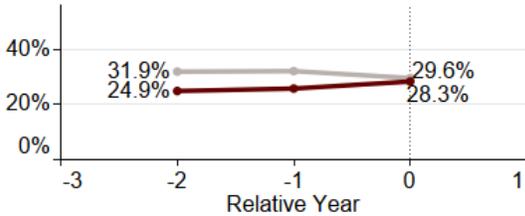
Long-Term Debt-to-Capitalization- Unbalanced

Comparison Group: 34.4% (year -2), 28.3% (year 0)
RCHD Participants: 24.9% (year -2), 27.5% (year 0)
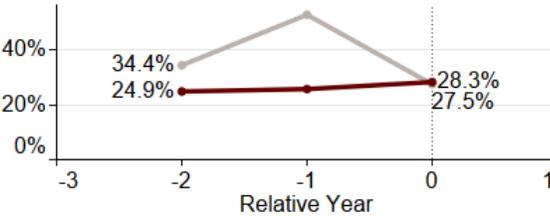
Average Age of Plant- Balanced

RCHD Participants: 18 (year -2), 15 (year 0)
Comparison Group: 9 (year -2), 9 (year 0)
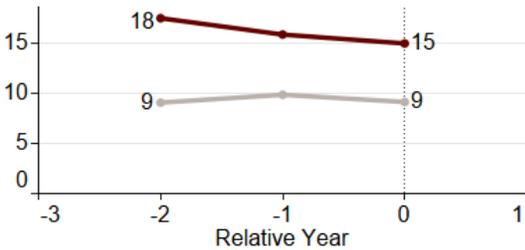
Average Age of Plant- Unbalanced

RCHD Participants: 18 (year -2), 15 (year 0)
Comparison Group: 12 (year -2), 12 (year 0)
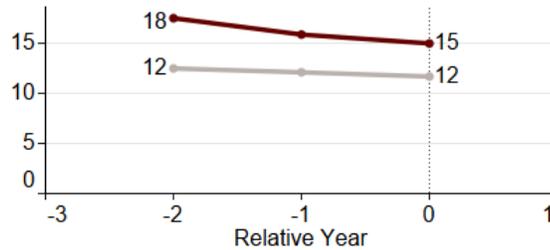
FTEs Per Occupied Bed- Balanced

Comparison Group: 14.3 (year -2), 11.7 (year 0)
RCHD Participants: 7.4 (year -2), 7.8 (year 0)
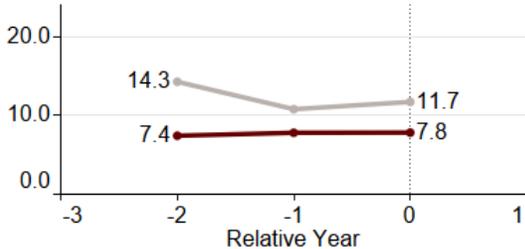
FTEs Per Occupied Bed- Unbalanced

Comparison Group: 9.2 (year -2), 10.2 (year 0)
RCHD Participants: 7.4 (year -2), 7.8 (year 0)
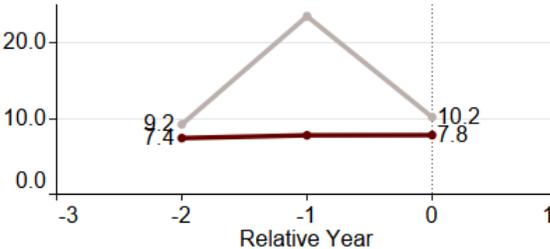
Salaries/ Net Patient Revenue- Balanced

Comparison Group: 44.6% (year -2), 46.6% (year 0)
RCHD Participants: 44.2% (year -2), 44.0% (year 0)
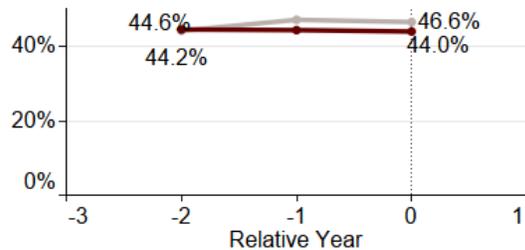
Salaries/ Net Patient Revenue- Unbalanced

Comparison Group: 45.8% (year -2), 46.2% (year 0)
RCHD Participants: 44.6% (year -2), 44.0% (year 0)
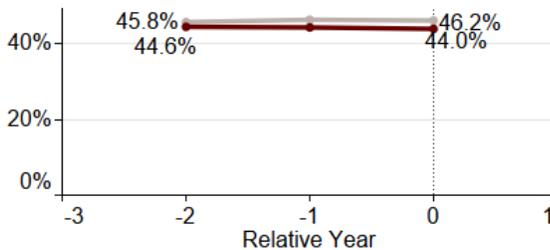
Baseline Financial Indicators: Balanced and Unbalanced (cont.)

Legend: ■ RCHD Participants ■ Comparison Group

Medicare Share of Inpatient Discharges- Balanced

RCHD Participants: 46.9% (year -2), 45.5% (year 0)
Comparison Group: 42.2% (year -2), 42.8% (year 0)
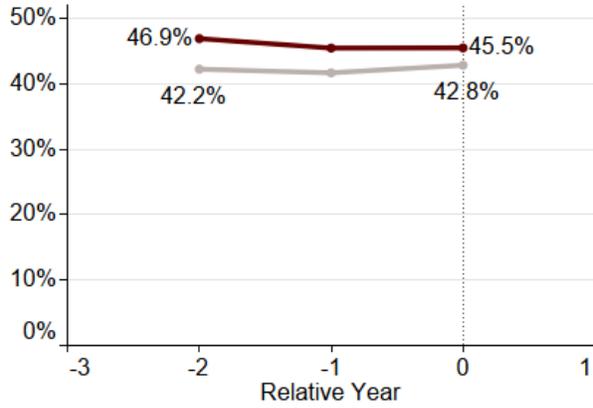
Medicare Share of Inpatient Discharges- Unbalanced

Comparison Group: 48.4% (year -2), 48.6% (year 0)
RCHD Participants: 46.9% (year -2), 45.5% (year 0)
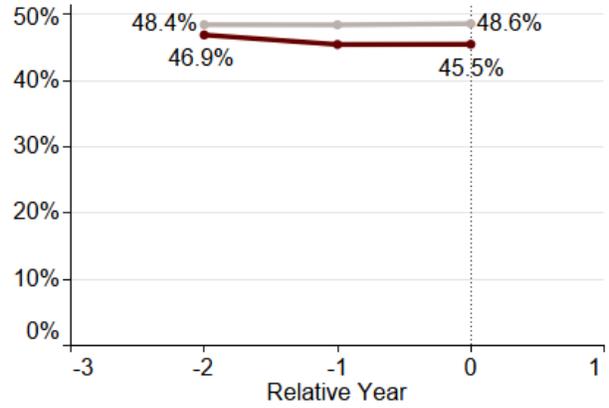
Medicare Share of Inpatient Days- Balanced

RCHD Participants: 60.9% (year -2), 60.7% (year 0)
Comparison Group: 52.4% (year -2), 52.9% (year 0)
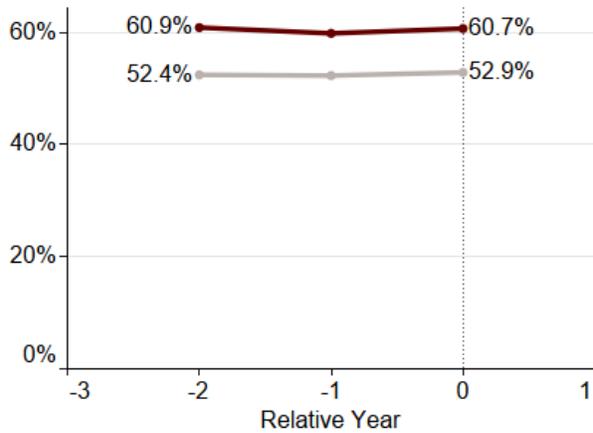
Medicare Share of Inpatient Days- Unbalanced

RCHD Participants: 60.9% (year -2), 60.7% (year 0)
Comparison Group: 58.9% (year -2), 59.0% (year 0)
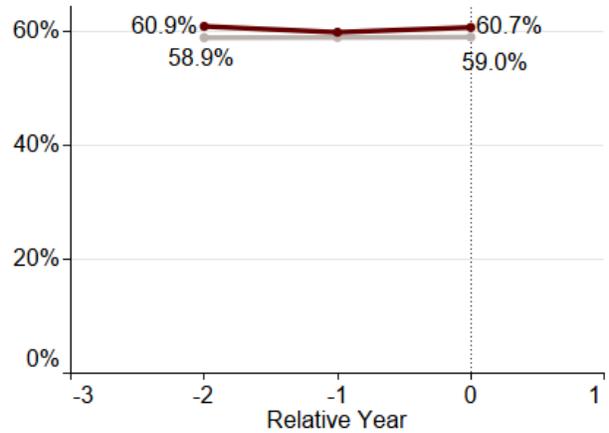
Medicare Swing Bed Share- Balanced

RCHD Participants: 5.7% (year -2), 7.5% (year 0)
Comparison Group: 2.3% (year -2), 1.8% (year 0)
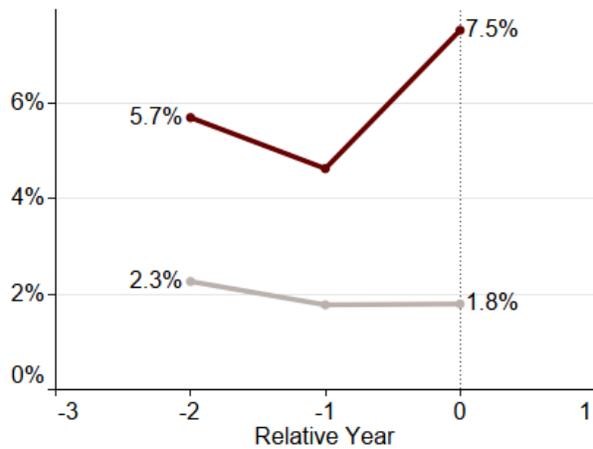
Medicare Swing Bed Share- Unbalanced

RCHD Participants: 5.7% (year -2), 7.5% (year 0)
Comparison Group: 3.1% (year -2), 2.6% (year 0)
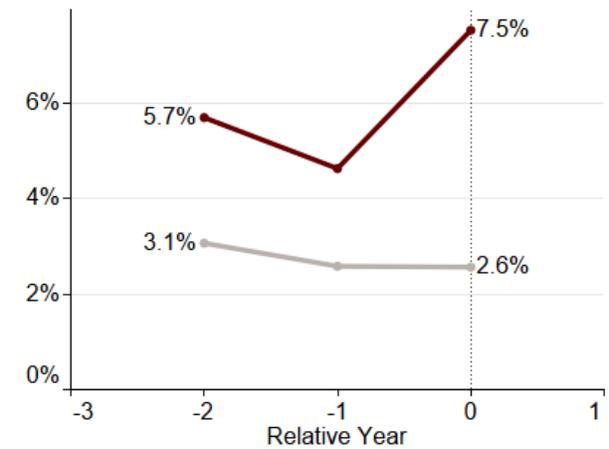
Exhibit G4: Test of Parallel Baseline Trends

Outcome	Baseline Year 1 Estimate	Baseline Year 1 p-value	Baseline Year 2 Estimate	Baseline Year 2 p-value	Joint F-Test p-Value	Sample Size
Total Profit Margin	0.43	0.88	-0.90	0.54	0.81	9,000
Operating Margin	-1.29	0.90	-0.16	0.93	0.84	9,000
Medicare Inpatient Margin	-0.58	0.90	-2.54	0.46	0.65	9,011
Medicare Combined Margin	-0.38	0.90	-1.61	0.52	0.74	9,019
Days Cash on Hand	-2.33	0.82	-4.02	0.66	0.91	9,020
Long-Term Debt-to-Capitalization	-3.73	0.49	-1.65	0.74	0.61	8,977
Ratio of Salaries to Net Patient Revenue	1.77	0.13	-0.30	0.80	0.21	8,999
Full Time Equivalents per Occupied Bed	-2.64	0.36	1.20	0.47	0.48	8,949
Average Age of Physical Plant	2.34	0.37	0.55	0.76	0.58	8,116
Medicare Inpatient Share	1.22	0.18	1.29	0.29	0.41	9,013
Medicare Inpatient Payer Mix	-0.41	0.75	-0.14	0.88	0.95	9,014
Medicare Swing Bed Revenue Share	-1.95*	0.01	-2.69***	0.00	0.02	9,013

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. ***indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. The comparison group was defined using an entropy balancing method.

Additional Results

Descriptive statistics tables accompanying Section 6.2

Exhibit G5: RCHD and Comparison Hospital Other (Non-Margin) Outcomes		
	RCHD Participant Hospitals	**Comparison Hospitals**
Days Cash on Hand		
Baseline Period Mean	105.16	77.19
Demonstration Period Mean	115.13	77.49
Difference	9.96	0.30
Long-Term Debt-to-Capitalization		
Baseline Period Mean	26.31	31.19
Demonstration Period Mean	21.78	26.14
Difference	-4.54	-5.05
Ratio of Salaries to Net Patient Revenue		
Baseline Period Mean	44.33	45.99
Demonstration Period Mean	44.35	44.26
Difference	0.02	-1.73
Hospital Full Time Equivalents per Occupied Bed		
Baseline Period Mean	7.67	12.24
Demonstration Period Mean	9.10	10.74
Difference	1.42**	-1.50
Average Age of Physical Plant		
Baseline Period Mean	16.11	9.36
Demonstration Period Mean	12.46	10.21
Difference	-3.64*	0.85
Medicare Share of Inpatient Discharges		
Baseline Period Mean	45.93	42.23
Demonstration Period Mean	43.21	40.75
Difference	-2.72*	-1.49*
Medicare Share of Inpatient Days		
Baseline Period Mean	60.45	52.53
Demonstration Period Mean	56.45	50.08
Difference	-4.00**	-2.44***
Medicare Swing Bed Revenue Share		
Baseline Period Mean	5.94	1.94
Demonstration Period Mean	11.54	1.29
Difference	5.60***	-0.65***
Sample Size (Hospital-Years)	**312**	**8,708**
Number of Hospitals	**29**	**511**

Notes: *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. The maximum sample-sizes for the set of outcomes in the table are reported; sample sizes may be slightly smaller for some outcomes due to missing data in some years.

Additional Sensitivity Checks Tables Accompanying Section 6.4.3

Exhibit G6: Sensitivity Checks Results: All Cohorts and Hospitals of all Market Typologies – Other Financial Outcomes					
	Days Cash on Hand	Long-Term Debt-to-Capitalization	Ratio of Salaries to Net Patient Revenue	Full Time Equivalents per Occupied Bed	Average Age of Physical Plant
Panel A: Full Sample DID Results (Summary from Section 6.5)					
Estimate	-2.90	-0.48	-0.63	1.33	-2.91*
p-Value	[0.80]	[0.93]	[0.69]	[0.45]	[0.09]
Sample Size (Number of Hospital-Years)	9,004	8,961	8,983	8,949	8,103
Number of RCHD Hospitals	29	29	29	29	29
Number of Comparison Hospitals	511	511	511	511	499
Panel B: Full Sample DID Results with Comparison Group from Non-Eligible States					
Estimate	0.56	-3.63	0.08	1.62	-3.10*
p-Value	[0.96]	[0.55]	[0.97]	[0.53]	[0.07]
Sample Size (Number of Hospital-Years)	7,804	7,777	7,785	7,761	7,000
Number of RCHD Hospitals	29	29	29	29	29
Number of Comparison Hospitals	457	457	457	457	445

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. The comparison group was defined using an entropy balancing method.

Exhibit G7: Sensitivity Checks Results: All Cohorts and Hospitals of all Market Typologies – Other Outcomes

	Medicare Share of Inpatient Discharges	Medicare Share of Inpatient Days	Medicare Swing Bed Revenue Share
Panel A: Full Sample DID Results (Summary from Section 6.5)			
Estimate	-0.68	-0.78	5.34***
p-Value	[0.19]	[0.33]	[0.00]
Sample Size (Number of Hospital-Years)	8,997	8,998	8,997
Number of RCHD Hospitals	29	29	29
Number of Comparison Hospitals	511	511	511
Panel B: Full Sample DID Results with Comparison Group from Non-Eligible States			
Estimate	-0.45	-0.53	5.43***
p-Value	[0.55]	[0.66]	[0.00]
Sample Size (Number of Hospital-Years)	7,797	7,798	7,797
Number of RCHD Hospitals	29	29	29
Number of Comparison Hospitals	457	457	457

*Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. The comparison group was defined using an entropy balancing method.*

Subgroup Analysis Regression Results

Exhibit G8: Difference-in-Differences Results: MMA Only – Financial Margins				
	Total Profit Margin	**Operating Margin**	**Medicare Inpatient Margin**	**Medicare Combined Margin**
Average Impact Estimate	-0.66	-0.98	20.46***^^^	17.38***^^^
90% Confidence Interval	(-5.21, 3.88)	(-6.07, 4.12)	(12.88, 28.05)	(11.56, 23.20)
Standard Error	(2.76)	(3.09)	(4.60)	(3.53)
Regression *p*-value	[0.81]	[0.75]	[0.00]	[0.00]
Randomization Inference *p*-value	[0.80]	[0.78]	[0.00]	[0.00]
Baseline Mean for RCHD Hospitals	4.41	2.45	-17.64	-15.81
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-15	-40	116	110
Sample Size (Hospital-Years)	5,796	5,796	5,811	5,813
Number of RCHD Hospitals	13	13	13	13
Number of Comparison Hospitals	414	414	414	414

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G9: Difference-in-Differences Results: MMA Only – Other Financial Outcomes					
	Days Cash on Hand	**Long-Term Debt-to-Capitalization**	**Ratio of Salaries to Net Patient Revenue**	**Full Time Equivalents per Occupied Bed**	**Average Age of Physical Plant**
Average Impact Estimate	-3.13	-14.60**	1.62	1.18	0.05
90% Confidence Interval	(-30.53, 24.26)	(-24.19, -5.01)	(-2.19, 5.44)	(-1.76, 4.12)	(-3.43, 3.52)
Standard Error	(16.63)	(5.82)	(2.32)	(1.78)	(2.11)
Regression *p*-value	[0.85]	[0.01]	[0.48]	[0.51]	[0.98]
Randomization Inference *p*-value	[0.94]	[0.63]	[0.58]	[0.85]	[0.99]
Baseline Mean for RCHD Hospitals	102.14	32.75	44.83	8.09	13.10
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-3	-45	4	15	0
Sample Size (Hospital-Years)	5,813	5,783	5,796	5,779	5,138
Number of RCHD Hospitals	13	13	13	13	13
Number of Comparison Hospitals	414	414	414	414	405

Notes: *Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. None of the coefficient estimates in this table are statistically significant at the 10% level using randomization inference. The comparison group was defined using an entropy balancing method.*

Exhibit G10: Difference-in-Differences Results: MMA Only– Medicare revenue indicators			
	Medicare Share of Inpatient Discharges	**Medicare Share of Inpatient Days**	**Medicare Swing Bed Revenue Share**
Average Impact Estimate	-1.38**	-0.92	3.73*^^
90% Confidence Interval	(-2.50, -0.27)	(-3.34, 1.50)	(0.19, 7.27)
Standard Error	(0.68)	(1.47)	(2.15)
Regression *p*-value	[0.04]	[0.53]	[0.08]
Randomization Inference *p*-value	[0.32]	[0.62]	[0.01]
Baseline Mean for RCHD Hospitals	45.79	61.52	7.07
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-3	-1	53
Sample Size (Hospital-Years)	5,811	5,812	5,811
Number of RCHD Hospitals	13	13	13
Number of Comparison Hospitals	414	414	414

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G11: Difference-in-Differences Results: ACA Only – Financial Margins

	Total Profit Margin	Operating Margin	Medicare Inpatient Margin	Medicare Combined Margin
Average Impact Estimate	-0.21	1.94	17.34***^^^	9.67***^^
90% Confidence Interval	(-3.10, 2.68)	(-1.04, 4.93)	(11.75, 22.93)	(4.92, 14.41)
Standard Error	(1.75)	(1.81)	(3.39)	(2.88)
Regression *p*-value	[0.91]	[0.28]	[0.00]	[0.00]
Randomization Inference *p*-value	[0.93]	[0.59]	[0.00]	[0.04]
Baseline Mean for RCHD Hospitals	3.17	-1.37	-13.81	-16.75
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-7	142	126	58
Sample Size (Hospital-Years)	3,188	3,188	3,184	3,190
Number of RCHD Hospitals	16	16	16	16
Number of Comparison Hospitals	366	366	366	366

*Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.*

Exhibit G12: Difference-in-Differences Results: ACA Only – Other Financial Outcomes

	Days Cash on Hand	Long-Term Debt-to-Capitalization	Ratio of Salaries to Net Patient Revenue	Full Time Equivalents per Occupied Bed	Average Age of Physical Plant
Average Impact Estimate	-7.39	8.01	-3.32**	-0.25	-5.11**^^
90% Confidence Interval	(-35.31, 20.53)	(-5.49, 21.52)	(-5.48, -1.15)	(-5.07, 4.58)	(-8.22, -2.00)
Standard Error	(16.95)	(8.20)	(1.31)	(2.93)	(1.89)
Regression *p*-value	[0.66]	[0.33]	[0.01]	[0.93]	[0.01]
Randomization Inference *p*-value	[0.69]	[0.79]	[0.17]	[0.89]	[0.03]
Baseline Mean for RCHD Hospitals	107.63	0.21	43.91	7.33	18.83
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-7	38	-8	-3	-27
Sample Size (Hospital-Years)	3,191	3,178	3,187	3,170	2,965
Number of Comparison Hospitals	366	365	366	366	356

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G13: Difference-in-Differences Results: ACA Only– Medicare revenue indicators

	Medicare Share of Inpatient Discharges	Medicare Share of Inpatient Days	Medicare Swing Bed Revenue Share
Average Impact Estimate	-1.38	-1.54	6.32***^^^
90% Confidence Interval	(-3.06, 0.29)	(-3.25, 0.17)	(3.64, 9.00)
Standard Error	(1.02)	(1.04)	(1.63)
Regression *p*-value	[0.17]	[0.14]	[0.00]
Randomization Inference *p*-value	[0.27]	[0.33]	[0.00]
Baseline Mean for RCHD Hospitals	46.05	59.58	5.02
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-3	-3	126
Sample Size (Hospital-Years)	3,186	3,186	3,186
Number of RCHD Hospitals	16	16	16
Number of Comparison Hospitals	366	366	366

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G14: Difference-in-Differences Results: Hospitals in Competitive Markets Only – Financial Margins

	Total Profit Margin	Operating Margin	Medicare Inpatient Margin	Medicare Combined Margin
Average Impact Estimate	-1.41	-0.38	15.90***^^^	7.18**^
90% Confidence Interval	(-5.28, 2.46)	(-6.38, 5.62)	(9.65, 22.15)	(1.80, 12.56)
Standard Error	(2.35)	(3.64)	(3.64)	(3.26)
Regression *p*-value	[0.55]	[0.92]	[0.00]	[0.03]
Randomization Inference *p*-value	[0.56]	[0.92]	[0.00]	[0.07]
Baseline Mean for RCHD Hospitals	0.02	-2.43	-15.10	-16.50
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-61	-16	105	44
Sample Size (Hospital-Years)	7,483	7,468	7,474	7,482
Number of RCHD Hospitals	17	17	17	17
Number of Comparison Hospitals	428	428	428	428

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G15: Difference-in-Differences Results: Hospitals in Competitive Markets Only – Other Financial Outcomes

	Days Cash on Hand	Long-Term Debt-to-Capitalization	Ratio of Salaries to Net Patient Revenue	Full Time Equivalents per Occupied Bed	Average Age of Physical Plant
Average Impact Estimate	7.27	14.63	-0.09	1.19	-3.44*
90% Confidence Interval	(-19.73, 34.27)	(-13.13, 42.39)	(-4.56, 4.37)	(-3.42, 5.79)	(-6.62, -0.27)
Standard Error	(16.39)	(16.39)	(2.71)	(2.80)	(1.93)
Regression *p*-value	[0.66]	[0.39]	[0.97]	[0.67]	[0.07]
Randomization Inference *p*-value	[0.72]	[0.64]	[0.97]	[0.65]	[0.16]
Baseline Mean for RCHD Hospitals	117.27	24.65	46.40	7.52	18.46
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	6	59	-0	16	-19
Sample Size (Hospital-Years)	7,483	7,446	7,467	7,437	6,749
Number of RCHD Hospitals	17	17	17	17	17
Number of Comparison Hospitals	428	428	428	428	418

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. None of the coefficient estimates in this table are statistically significant at the 10% level using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G16: Difference-in-Differences Results: Hospitals in Competitive Markets Only – Medicare revenue indicators

	Medicare Inpatient Share	Medicare Inpatient Payer Mix	Medicare Swing Bed Revenue Share
Average Impact Estimate	-0.74	-0.42	6.07***^^^
90% Confidence Interval	(-1.86, 0.37)	(-1.70, 0.85)	(2.63, 9.51)
Standard Error	(0.68)	(0.77)	(2.09)
Regression *p*-value	[0.27]	[0.58]	[0.00]
Randomization Inference *p*-value	[0.49]	[0.76]	[0.00]
Baseline Mean for RCHD Hospitals	49.84	65.81	7.77
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-1	-1	78
Sample Size (Hospital-Years)	7,476	7,477	7,476
Number of RCHD Hospitals	17	17	17
Number of Comparison Hospitals	428	428	428

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G17: Difference-in-Differences Results: Hospitals in Frontier Markets Only – Financial Margins				
	Total Profit Margin	Operating Margin	Medicare Inpatient Margin	Medicare Combined Margin
Average Impact Estimate	2.87	1.43	21.18***^^	14.20***^^
90% Confidence Interval	(-1.67, 7.42)	(-5.27, 8.13)	(15.68, 26.68)	(9.90, 18.50)
Standard Error	(2.76)	(4.07)	(3.34)	(2.61)
Regression *p*-value	[0.30]	[0.73]	[0.00]	[0.00]
Randomization Inference *p*-value	[0.26]	[0.64]	[0.01]	[0.01]
Baseline Mean for RCHD Hospitals	4.99	4.20	-21.51	-20.61
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	58	34	98	69
Sample Size (Hospital-Years)	962	962	963	963
Number of RCHD Hospitals	7	7	7	7
Number of Comparison Hospitals	64	64	64	64

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G18: Difference-in-Differences Results: Hospitals in Frontier Markets Only – Other Financial Outcomes					
	Days Cash on Hand	Long-Term Debt-to-Capitalization	Ratio of Salaries to Net Patient Revenue	Full Time Equivalents per Occupied Bed	Average Age of Physical Plant
Average Impact Estimate	-4.37	-3.27	0.13	0.33	-0.56
90% Confidence Interval	(-32.11, 23.37)	(-21.74, 15.20)	(-5.37, 5.63)	(-0.77, 1.44)	(-6.00, 4.89)
Standard Error	(16.84)	(11.21)	(3.34)	(0.67)	(3.30)
Regression *p*-value	[0.80]	[0.77]	[0.97]	[0.62]	[0.87]
Randomization Inference *p*-value	[0.90]	[0.78]	[0.96]	[0.66]	[0.79]
Baseline Mean for RCHD Hospitals	87.83	32.05	39.99	8.13	8.30
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-5	-10	0	4	-7
Sample Size (Hospital-Years)	963	962	962	962	865
Number of RCHD Hospitals	7	7	7	7	7
Number of Comparison Hospitals	64	64	64	64	63

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. None of the coefficient estimates in this table are statistically significant at the 10% level using traditional or randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G19: Difference-in-Differences Results: Hospitals in Frontier Markets Only – Medicare revenue indicators			
	Medicare Inpatient Share	Medicare Inpatient Payer Mix	Medicare Swing Bed Revenue Share
Average Impact Estimate	0.70	-0.09	2.04^^
90% Confidence Interval	(-0.48, 1.89)	(-1.89, 1.71)	(0.05, 4.03)
Standard Error	(0.72)	(1.09)	(1.21)
Regression *p*-value	[0.33]	[0.93]	[0.10]
Randomization Inference *p*-value	[0.54]	[0.97]	[0.01]
Baseline Mean for RCHD Hospitals	36.02	46.53	0.45
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	2	-0	454
Sample Size (Hospital-Years)	963	963	963
Number of RCHD Hospitals	7	7	7
Number of Comparison Hospitals	64	64	64

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. None of the coefficient estimates in this table are statistically significant at the 10% level using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G20: Difference-in-Differences Results: Hospitals in Isolated Markets Only – Financial Margins

	Total Profit Margin	Operating Margin	Medicare Inpatient Margin	Medicare Combined Margin
Average Impact Estimate	-3.34	-5.53	5.12	6.74
90% Confidence Interval	(-9.47, 2.79)	(-11.81, 0.76)	(-9.29, 19.53)	(-4.69, 18.17)
Standard Error	(3.72)	(3.81)	(8.75)	(6.94)
Regression *p*-value	[0.36]	[0.15]	[0.56]	[0.34]
Randomization Inference *p*-value	[0.34]	[0.38]	[0.33]	[0.20]
Baseline Mean for RCHD Hospitals	6.75	4.36	-8.60	-9.77
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-50	-127	60	69
Sample Size (Hospital-Years)	536	536	548	548
Number of RCHD Hospitals	5	5	5	5
Number of Comparison Hospitals	42	42	43	43

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. None of the coefficient estimates in this table are statistically significant at the 10% level using traditional or randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G21: Difference-in-Differences Results: Hospitals in Isolated Markets Only – Other Financial Outcomes

	Days Cash on Hand	Long-Term Debt-to-Capitalization	Ratio of Salaries to Net Patient Revenue	Full Time Equivalents per Occupied Bed	Average Age of Physical Plant
Average Impact Estimate	-65.29***^^	-13.65**	-1.58	-0.60	6.71
90% Confidence Interval	(-90.68, -39.89)	(-24.41, -2.90)	(-4.20, 1.04)	(-1.49, 0.29)	(-1.29, 14.71)
Standard Error	(15.41)	(6.53)	(1.59)	(0.54)	(4.86)
Regression *p*-value	[0.00]	[0.04]	[0.33]	[0.27]	[0.17]
Randomization Inference *p*-value	[0.05]	[0.94]	[0.51]	[0.95]	[0.29]
Baseline Mean for RCHD Hospitals	88.26	23.93	43.35	7.54	16.44
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-74	-57	-4	-8	41
Sample Size (Hospital-Years)	549	537	536	534	471
Number of RCHD Hospitals	5	5	5	5	5
Number of Comparison Hospitals	43	42	42	42	40

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, using traditional inference. ^^^ indicates statistical significance at the 1% level, ^^ at the 5% level, and ^ at the 10% level, using randomization inference. The comparison group was defined using an entropy balancing method.

Exhibit G22: Difference-in-Differences Results: Hospitals in Isolated Markets Only – Medicare revenue indicators			
	Medicare Inpatient Share	Medicare Inpatient Payer Mix	Medicare Swing Bed Revenue Share
Average Impact Estimate	-0.15	1.28	4.60
90% Confidence Interval	(-2.30, 2.00)	(-1.09, 3.66)	(-0.83, 10.03)
Standard Error	(1.31)	(1.44)	(3.30)
Regression *p*-value	[0.91]	[0.38]	[0.17]
Randomization Inference *p*-value	[0.95]	[0.56]	[0.13]
Baseline Mean for RCHD Hospitals	46.53	61.74	7.41
Average Impact Estimate as a Percentage of the RCHD Group Baseline Mean	-0	2	62
Sample Size (Hospital-Years)	549	549	548
Number of RCHD Hospitals	5	5	5
Number of Comparison Hospitals	43	43	43

Notes: Standard errors, clustered at the hospital level and robust to heteroscedasticity, are in parentheses. None of the coefficient estimates in this table are statistically significant at the 10% level using traditional or randomization inference. The comparison group was defined using an entropy balancing method.

APPENDIX H: DATA CLEANING

HCRIS data sometimes have outlier values and trends with high variance for certain variables for hospitals in all years or in only some years. As a result, we examined the distribution of each variable through a variety of methods such as summary statistics, percentile values, and manually examining trends of hospitals with exceptionally large or small values of a certain variable. Through this process, we identified seven variables (six outcomes and one hospital market characteristic) to which we performed data cleaning. In the next report, we will further explore the distributions of each variable and test robustness to additional data cleaning. The list of variables we modified from the raw values in this report are the following:

- Debt-to-service coverage ratio
    - Due to very high variance and a large number of missing values, this outcome was excluded from being reported in the body of this report. Results for this outcome and further discussion of the data quality of this outcome are discussed in detail in Appendix D.
    - In the results reported in Appendix F, we winsorized at the 1st and 99th percentiles (i.e., replaced any values smaller than the 1st percentile value with the 1st percentile value and replaced any values larger than the 99th percentile with the 99th percentile value).
- Total profit margins
    - Winsorized at -100 percent and 100 percent
- Operating margins
    - Winsorized at -100 percent and 100 percent
- Medicare inpatient margins
    - Winsorized at -100 percent and 100 percent
- Medicare combined margins
    - Winsorized at -100 percent and 100 percent
- Average age of physical plant
    - Winsorized at -60 years and 60 years
- Median home value
    - Winsorized at the 99th percentile
- Full time equivalents per occupied bed
    - Winsorized at the 99th percentile