Findings Brief
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Differences in Measurement of Operating Margin: An Update

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INTRODUCTION

Operating margin is one of the key measures of hospital profitability. Profitability is a determinant of financial distress and closure.[1] As rural hospitals struggle to remain profitable and in business, researchers, policy makers, and administrators analyze profitability measures to make comparisons, set benchmarks, and to help understand causes and potential mitigation strategies for hospital closure. Accurate use of the measure relies on the quality of data, and previous studies found inconsistencies in how operating margin is calculated and reported.[2]

Operating margin is defined as operating income (operating revenue minus operating expense) divided by operating revenue. It is useful because it focuses on core business operations and excludes the effects of income, expense, and losses/gains from non-operating activities such as investments or government subsidies. Although operating margin is a commonly used financial ratio, it should be used with caution when Medicare Cost Reports are the source of data because:

1) *There are different definitions of operating margin*. There is no single definition of what constitutes operating activities, and hospitals may make different decisions as to what elements to include when measuring operating margin.[3]
2) *Operating expense in the Medicare Cost Report is not disaggregated into "patient care" and "other operating"*. For example, operating expense includes both the cost of drugs for both inpatients (patient care expense) and outpatient pharmacy (other operating expense).
3) *Operating margins have been found to vary widely, sometimes at extremes that seem unlikely*. There are known variations in financial reporting among different sources of data (i.e., audited financial statements, Medicare Cost Reports, and the Internal Revenue Service form 990).[4]

A 2008 study by the Flex Monitoring Team examined three definitions of operating margin that use different measures of operating revenue but the same measure of operating expense.[5] Since that study, hospital operating revenue has changed considerably: a much higher proportion comes from outpatient services, payer mix has changed because of Medicaid expansion, and there has been extensive growth of Medicare Advantage. This brief serves as a technical note for researchers and policy makers when using and interpreting operating margins calculated using Medicare Cost Report data. In this brief, we use recent Medicare Cost Report data to compare rural and urban hospitals using the three definitions for operating margin and assess the distribution and extent of extreme values of operating margin.

KEY FINDINGS

The purpose of this study is to compare rural and urban hospitals using the three definitions for operating margin and assess the distribution and extent of extreme values of operating margin. We found that:

- Among three different definitions for operating margin that use Medicare Cost Report data, an operating margin based on patient care plus other operating revenue probably has the best matching of hospital operating revenue to operating expense. However, other definitions may be more appropriate for specific questions.
- Similar to previous reports, we found there are rural and urban hospitals with unusually low and unusually high operating margins. Whether these values are due to real operating performance or reporting variations cannot be determined from Medicare Cost Report data.

METHODS

Types of hospitals in study

The study included Critical Access Hospitals (CAHs) and acute care hospitals paid under the prospective payment system (PPS).[6] Hospitals paid under the PPS were designated as either rural location (R-PPS) or urban location (U-PPS). Hospitals were defined as rural using the 2022 definition used by the Federal Office of Rural Health Policy (FORHP).[7] FORHP defines the following areas as rural: All non-metro counties, all metro census tracts with RUCA codes 4-10, and large area Metro census tracts of at least 400 square miles in area with population density of 35 or less per square mile with RUCA codes 2-3. FORHP considers all outlying metro counties without an urbanized area (50,000 or more people) to be rural.

Number of Medicare Cost Reports and time period of study

Hospital-level financial data on urban and rural acute hospitals were drawn from the Medicare Cost Reports in the Healthcare Cost Reporting Information System (HCRIS) for the period April 1, 2021 to March 31, 2022. This time period was selected to avoid a study sample that included a mix of cost reports with and without COVID-19 Public Health Emergency Funding ("PHE Funding"). PHE funding was first distributed to hospitals in April 2020: therefore, all study hospitals include PHE funding, although the timing of reporting varies across hospitals.[8] We excluded cost reports for Indian Health Service (due to lack of data) and cancer hospitals (none in rural areas). We also excluded cost reports with days in period < 360 and net patient revenue ≤ $0. The final sample included cost reports for 1,323 CAHs, 878 R-PPS hospitals, and 2,165 U-PPS hospitals, for a total of 4,366 hospitals.

Three definitions of operating margin

Different organizations may include different components in their formula/definition of operating revenue or operating expense; consequently, operating margin can vary considerably even when utilizing the same set of data. From the previous study by the Flex Monitoring Team, the three definitions are:

Patient care only operating margin (PC) measures the margin from patient care only. The premise is that patient care is the main line of business of the organization and, as such, only the revenue and expense of providing patient care should be included in the operating margin.

Patient care and other operations operating margin (PCO) measures the margin from patient care and other operations, such as outpatient pharmacy. The premise is that income from outpatient pharmacy, for example, would not be received in the absence of patient care and therefore should be included in the operating margin.

Patient care, other operations, and government appropriations operating margin (PCOG) measures the margin from patient care, other operations, and government appropriations, such as county tax revenue. The premise is that income from other operations and county taxes, for example, would not be received in the absence of patient care and therefore should be included in the operating margin.

Table 1. Three Definitions of Operating Margin Using Medicare Cost Report Data

	Patient care only (PC)	Patient care and other operating (PCO)	Patient care, other operating, and government appropriations (PCOG)
Numerator Definition	Net patient revenue – Total operating expense	Net patient revenue + other revenue* – Total operating expense	Net patient revenue + other revenue* + government appropriations – Total operating expense
Numerator Worksheet G lines	Line 3 – Line 4	(Line 3 + Lines 8 to 22 + Line 24) – (Line 4)	(Line 3 + Lines 8 to 22 + Line 24 + Line 23) – (Line 4)
Denominator Definition	Net patient revenue	Net patient revenue + other revenue	Net patient revenue + other revenue + government appropriations
Denominator Worksheet G lines	Line 3	Line 3 + Lines 8 to 22 + Line 24	Line 3 + Lines 8 to 22 + Line 24 + Line 23

*Other revenue include: revenue from telephone and telegraph service; revenue from television and radio service; purchase discounts; rebates and refunds of expense; parking lot receipts; revenue from laundry and linen service; revenue from meals sold to employees and guests; revenue from rental of living quarters; revenue from sale of medical and surgical supplies to other than patients; revenue from sale of drugs to other than patients; revenue from sale of medical records and abstracts; tuition (fees, sale of textbooks, uniforms, etc.); revenue from gifts, flowers, coffee shops, and canteen; rental of vending machines; rental of hospital space; and other.

RESULTS

Reporting of operating expense

In Table 1, notice that all three definitions use "total operating expense" (line 4). Unfortunately, Medicare Cost Reports do not disaggregate operating expense into "patient care" and "other operating". For example, the cost of drugs for inpatients (patient care) and "from sale of drugs to other than patients" (other operating) are both included in total operating expense (line 4). For this reason, the best matching of operating revenue to operating expense may be the PCO operating margin.

We also examined Worksheet G-3 line 27 "Other expense (specify)" to assess whether additional operating expense information could be gleaned. Although many hospitals reported "other expense" on line 27, some of these expenses could not be considered operating expense, such as gain/loss on disposal of asset, unrestricted donations, construction, equity earnings, and non-operating investment earnings. It may be that these items are reported on line 27 because there is no other line in Worksheet G-3 on which they can be included. Therefore, line 27 was not used in any definition of operating margin.

2021-22 medians of three operating margins

Table 2 compares the 2021-22 medians of three operating margins by Medicare payment classification. As expected, the table shows that PC < PCO < PCOG because PC includes patient care revenue only, PCO includes patient care and other operating revenue, PCOG includes patient care and other operating revenue and government appropriations, and all three use the same operating expense.

There are large percentage point differences between the median PC and PCO: 16.7 percentage points for CAHs, 11.1 points for R-PPS hospitals, and 6.6 for U-PPS hospitals. The study period of 2021-22 was a year impacted by COVID-19, so some of the large differences between PC and PCO are due to exclusion of PHE Funding in the PC and inclusion in the PCO. The percentage point differences between the median PCO and PCOG are much smaller: 0.8 percentage points for CAHs, 0.7 points for R-PPS hospitals, and 0.2 points for U-PPS hospitals. Many rural hospitals report government appropriations of zero or only relatively small amounts.

Table 2. 2021-22 Medians of Three Definitions of Operating Margin by Medicare Payment Classification

Medicare payment classification	Patient care only (PC)	Patient care and other operating (PCO)	Patient care, other operating, and government appropriations (PCOG)
CAH	-5.8%	10.9%	11.7%
R-PPS	-4.6%	6.5%	7.2%
U-PPS	0.7%	7.3%	7.5%

There is no one right way to define operating margin because the decision needs vary among situations and organizations. However, given the account structure in the Medicare Cost Report, the PCO probably has the best matching of operating revenue to operating expense, as explained above. The PC operating margin is likely understated because revenue from other operations and PHE Funding is excluded, but associated expense is included. The PCOG operating margin includes government appropriations that may not be directly related to patient care and transitory. Therefore, the remainder of this study uses the PCO definition of operating margin.

There are very high and low operating margins

Figure 1 shows a boxplot of 2021-22 operating margins by Medicare Payment Classification. In the shaded box, the horizontal line in the middle is the median, the top of the box is the 75th percentile, and the bottom of the box is the 25th percentile total margin. The interquartile range (IQR) is the length of the box in a box-and-whisker plot. The "whiskers" above and below the shaded box represent values that lie more than one and a half times the length of the box from either end of the box. That is, the lower whisker is Q1 – 1.5×IQR and the upper whisker is Q3 + 1.5×IQR. The dots above the upper whisker and below the lower whisker are outliers – they are far from the central values.

Figure 1 shows that all three Medicare payment classifications have large numbers of positive and negative outliers. These are 2021-22 operating margins that include PHE Funding, but similar patterns of outliers are also evident in pre-COVID-19 years (not shown). The maximum 2021-22 operating margins are 87.8% for CAHs, 82.5% for R-PPS hospitals, and 77.1% for U-PPS hospitals. This prompts the question "are these real levels of operating profitability or reporting variations?"

Consider a hospital with $10 million in operating revenue. To achieve an operating margin of 80% would require operating expense to be $2 million:

$$\text{Operating margin} = \frac{\text{Operating revenue – operating expense}}{\text{Operating revenue}} = \frac{\$10 \text{ million - } \mathbf{\$2 \text{ million}}}{\$10 \text{ million}} = \mathbf{80\%}$$

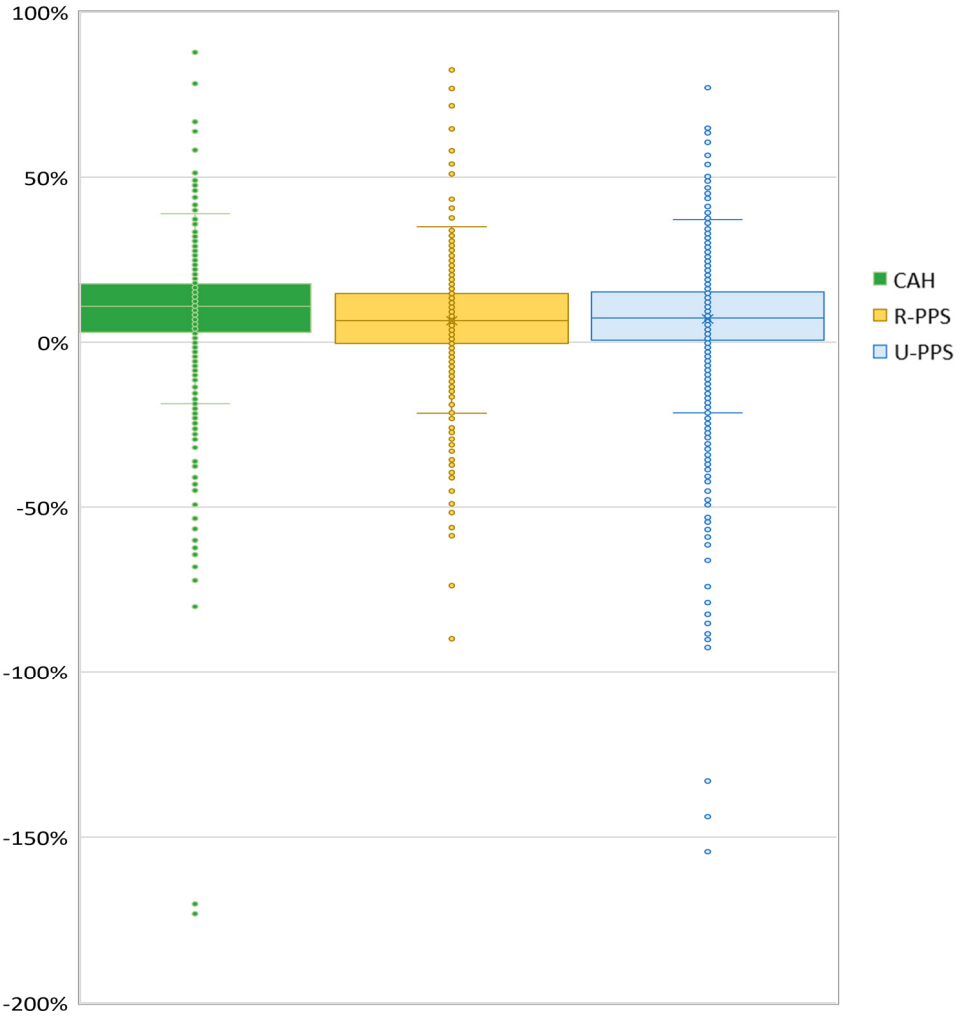
Is it possible for a hospital with operating revenue of $10 million to have operating expense of only $2 million? In theory, yes, but we suspect many hospital executives would assess this as unlikely and probably due to exceptional circumstances or reporting variation.

In contrast, the minimum 2021-22 operating margins are -173.2% for CAHs, -89.9% for R-PPS hospitals, and -154.4% for U-PPS hospitals. To experience an operating margin of -150%, a hospital with $10 million in operating revenue would have operating expense of $25 million:

$$\text{Operating margin} = \frac{\text{Operating revenue – operating expense}}{\text{Operating revenue}} = \frac{\$10 \text{ million - } \mathbf{\$25 \text{ million}}}{\$10 \text{ million}} = \mathbf{-150\%}$$

Is it possible for a hospital with operating revenue of $10 million to have operating expense of $25 million? Again, in theory, yes, but we suspect many hospital executives would also assess this as unlikely and probably due to exceptional circumstances or reporting variation.

Figure 1. 2021-22 Operating Margins by Medicare Payment Classification



CONCLUSION

This brief serves as a technical note for researchers and policy makers when using and interpreting operating margins calculated using Medicare Cost Report data. There are three definitions of operating margin; each will produce different results. We examined the measurement of operating margin of rural and urban hospitals using recent data, and we assessed the distribution and extent of extreme values of operating margin. We found that among the three definitions that use Medicare Cost Report data, **an operating margin based on patient care plus other operating revenue probably has the best overall matching of hospital operating revenue to operating expense**. However, other definitions may be more appropriate for specific questions. For example, if management was interested in the operating profitability of patient care services only, the PC would be the relevant operating margin. For hospitals with substantial government support, the PCOG could be the more relevant operating margin. We also found that among all hospitals, there are some that have surprisingly low (e.g., -150%) and some with surprisingly high operating margins (87%). Whether these values are due to real operating performance or reporting variations cannot be determined from Medicare Cost Report data. Many hospital executives would likely assess very low or high operating margins as unlikely and probably due to exceptional circumstances or reporting variation. Definition selection and range should be kept in mind when using Medicare Cost Report data to study hospital operating margins.

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