Review effect on cost reports: Impact smaller than anticipated

by C. McKeen Cowles

Hospitals seeking Medicare payment are required to submit Medicare Cost Reports to their respective fiscal intermediaries, who in turn are required to desk review and sometimes audit the reports. The reviewed or audited report is considered more reliable than the originally submitted report and provides the basis for final Medicare payment. This study quantifies the impact of the review process, finding that, for the most part, the effect is quite small, usually less than 1 percent. Passthrough costs, however, were the exception to this rule. Capital and education passthrough costs, on a per discharge basis, were reduced about 6 percent.

Background

Federal regulations require hospitals to submit Medicare Cost Reports as a prerequisite to Medicare payment. Each participating hospital must submit the report to its designated fiscal intermediary (FI) and must do so within 90 days of the close of the hospital's fiscal year (FY). The FI's receipt of the cost report begins a dual countdown. Within 90 days of receipt, the FI must submit the cost report in machine-readable form to the Health Care Financing Administration (HCFA) of the Department of Health and Human Services, and, within 365 days of receipt, the FI must audit and/or desk review the initial cost report and submit a "settled" cost report to HCFA. The settled cost reports, be they "settled with audit" or "settled without audit," are subject to several levels of appeal. If the appeal process results in a modification to the settled cost report, a "re-opened" cost report eventually finds it way into the HCFA data base.

The most reviewed cost report (settled or re-opened), not the originally submitted report, provides the basis for final Medicare payment and is considered more reliable. Unfortunately, legislative and regulatory considerations demand the extensive use of as-submitted costs reports in the development of administrative policy and statutory requirements. The tradeoff between timeliness and verified accuracy of Medicare Cost Reports is an issue given little attention in the literature, in spite of the considerable conflict it creates among legislators and policymakers and even within the research community. There are two basic issues that need to be addressed:

- Do as-submitted cost reports tend to overstate the aggregate level of costs, revenues, or other variables of analytical interest to health economists?
- Does the final effect of the audit and/or review process vary systematically among groups of hospitals?

A review of the literature uncovered only one study, and this relating only to the first issue. The Comptroller General of the U.S. General Accounting Office (GAO) released a study in 1985, which reported that:

"(I)ntermediary desk reviews and field audits on the average substantially reduce submitted costs by removing unallowable costs from them. For example, our analysis of data maintained by HCFA on cost reports that were only desk reviewed shows that these reviews on the average reduced hospital reported costs by 5.3 percent in fiscal year 1981 and 6.9 percent in fiscal year 1982.

"To determine the effect of using unaudited cost data to compute the standardized amount for PPS [prospective payment system], we reviewed a randomly selected sample of 418 hospitals and compared the costs HCFA used to compute the standardized amount to the field audited costs. This comparison showed that unallowable costs included in the submitted cost reports averaged 2.98 percent of total operating costs per discharge.

"The allowable average cost per discharge computed by HCFA for the sample hospitals was overstated by about $73 per discharge" (U.S. General Accounting Office, 1985).

Purpose

The general focus of this research is to gain a better understanding of the impact that the review process has on some Medicare cost report variables of analytical interest. Since the implementation of PPS in Federal FY 1984, have as-submitted cost reports systematically overstated cost by the magnitude claimed in the GAO report? Are Medicare days, discharges, or revenues similarly misstated? If so, are there systematic variations in review process impact by urbanicity, teaching status, FI, or some other combination of demographic and economic circumstances? The objectives of this study are to answer these questions, identify whatever systematic variation may exist, and incorporate the information into a mathematical model. Such a model might lead to a better understanding of the effect of the review process and thereby have the potential to improve future analyses of unaudited Medicare Cost Reports.

Data

A data base was constructed from the Hospital Cost Report Information System (HCRIS) and provider-specific files. (Both the HCRIS file, which contains the cost reports, and the provider-specific file, which contains demographic information and variables in the payment formula not contained in the cost report, are public-use files maintained by HCFA's Bureau of Data Management and Strategy.) First, cost reports for accounting years

beginning during Federal FY 1984 (PPS-1) were paired. The least reviewed (as-submitted) Medicare cost report for each hospital was paired with the same hospital's most reviewed (settled or re-opened) version of the report. Once paired, the most reviewed version of the cost report, the least reviewed version of the cost report, and the provider-specific file were merged.

Observations were deleted from the resulting data set when the hospital was not short-term general, was located in one of the four States with waivers from PPS at that time, was not paid under PPS for some other reason, or had missing or unlikely values for important cost report variables. These steps created a PPS-1 data file containing 3,973 observations. Each observation, representing one hospital, contained both the as-submitted value of each cost report variable of interest and that variable's final value at the conclusion of the review process, as well as each provider-specific file variable.

The data set thus created was used to measure the effect of the review process on the selected Medicare cost report variables. One such measure of the review process impact is the "audit ratio." The audit ratio is defined as the most reviewed value of a variable divided by the as-submitted value. When multiplied by the as-submitted value, the audit ratio yields the ultimate value of the

variable after desk review and/or audit and/or appeal. An audit ratio of 1, for example, implies that the variable was unchanged as a result of the review process. An audit ratio of 0.9 implies that the review process resulted in a 10-percent reduction. Table 1 reports audit ratio means, medians, and standard deviations for eight selected cost report variables. Additional information about the distribution of the audit ratios is reported in Table 2.

Descriptive results

Note that all but one of the mean audit ratios are less than unity. Except for operating revenue per case, the audit and/or review process, on average, reduced all the variables under consideration. Note also that, with the exception of the two passthrough cost audit ratios, all the mean audit ratios are very close to 1. The average review process impact on Medicare days, Medicare discharges, Medicare operating costs per case, Medicare operating revenue per case, and total Medicare revenue per case was less than 1 percent in the PPS-1 year. Total Medicare costs per case were reduced, on average, 1.2 percent. The largest review process impact, as evidenced by audit ratios farthest from zero, were in the two passthrough cost categories. On average, the auditors disallowed 6.6 percent of capital passthrough costs per case and 5.5 percent of direct medical education passthrough costs per case in the PPS-1 year.

The distribution of the audit ratios is interesting. With the exception of the two passthrough costs, the difference between the mean and median audit ratios is quite small, suggesting a somewhat symmetrical distribution. The mean passthrough cost audit ratios, on the other hand, are significantly less than their associated medians, indicating distributions that are skewed to the left. This finding is consistent with the expectation that large audit reductions to passthrough costs are more likely than large increases. Note that none of the audit ratios is normally distributed. In every case, the standard deviations reported in Table 1 are large relative to the interquartile range information reported in Table 2. This is because a small proportion of the ratios, those representing the largest audit adjustments, are extremely variable.

Table 3 breaks out the operating and passthrough cost per case audit ratios by urban versus rural location and U.S. census division. For example, row 1 of column 5 represents the overall 0.5-percent review process reduction to Medicare operating costs per case that was reported in Table 1. The next two rows divide the national average audit ratio into urban versus rural location. The implication in rows 2 and 3 of column 5 is that the review process impact on Medicare operating costs per case occurs mostly in urban rather than rural hospitals, but, reading further down column 5 in rows 4 through 21, this pattern is not at all clear regionally. In four of the nine census divisions, the audit adjustment was greater for the rural group than the urban. Among rural hospitals, the mean operating cost per case audit ratios ranged from a low of 0.97084 in New England to a high of 1.02597 in the Middle Atlantic Division. Urban mean operating cost per case audit ratios ranged from

Table 1

Average audit ratios for selected Medicare cost report variables

Variable	Mean	Median	Standard deviation
Medicare days	0.99180	0.99997	0.10701
Medicare discharges	0.99195	1.00000	0.08785
Medicare operating costs per case	0.99477	0.99791	0.10391
Capital passthrough costs per case	0.93394	0.97234	0.17037
Direct medical education passthrough costs per case	0.94509	0.97972	0.36507
Total Medicare costs per case	0.98758	0.99421	0.10125
Medicare operating revenue per case	1.00585	1.00000	0.16710
Total Medicare revenue per case	0.99846	0.99769	0.10184

SOURCE: Cowles, C. M., American Health Care Association.

Table 2

Distribution of audit ratios for selected Medicare cost report variables by percentile

Variable	Percentile			
	10th	25th	75th	90th
Medicare days	0.94759	0.97984	1.00828	1.03139
Medicare discharges	0.95816	0.98540	1.00000	1.01477
Medicare operating costs per case	0.93345	0.97403	1.02127	1.05846
Capital passthrough costs per case	0.79478	0.90019	1.00800	1.05934
Direct medical education passthrough costs per case	0.66190	0.89195	1.01294	1.08238
Total Medicare costs per case	0.92532	0.96835	1.01581	1.05023
Medicare operating revenue per case	0.96039	0.98711	1.02039	1.07640
Total Medicare revenue per case	0.94977	0.97934	1.01574	1.06662

SOURCE: Cowles, C. M., American Health Care Association.

Table 3
Mean audit ratios for selected Medicare cost variables

Row (1)	Urbanicity (2)	Census division (3)	Number of hospitals (4)	Medicare operating costs per case (5)	Passthrough costs	
					Capital costs per case (6)	Direct medical education costs per case (7)
1	Both	National	3,973	0.99477	0.93394	0.94509
2	Rural	National	2,082	1.00045	0.94263	0.96583
3	Urban	National	1,891	0.99362	0.93204	0.94468
4	Rural	New England	33	0.97084	0.95978	0.97128
5	Rural	Middle Atlantic	37	1.02597	0.98581	1.00755
6	Rural	South Atlantic	245	0.99769	0.94097	0.86717
7	Rural	East North Central	309	1.00028	0.95515	1.00949
8	Rural	East South Central	259	1.00043	0.92616	1.00905
9	Rural	West North Central	507	0.99836	0.94329	1.02245
10	Rural	West South Central	349	0.98975	0.93828	0.80576
11	Rural	Mountain	217	1.00982	0.94383	0.72271
12	Rural	Pacific	126	1.02489	0.91002	0.99751
13	Urban	New England	72	0.99967	0.95214	0.95812
14	Urban	Middle Atlantic	139	1.00182	0.95521	0.96717
15	Urban	South Atlantic	311	0.98801	0.91167	0.92884
16	Urban	East North Central	399	1.00228	0.96600	0.96725
17	Urban	East South Central	122	1.00351	0.93876	0.94433
18	Urban	West North Central	131	0.98611	0.95673	0.90098
19	Urban	West South Central	267	0.99245	0.91764	0.99240
20	Urban	Mountain	72	1.00153	0.90719	1.00679
21	Urban	Pacific	378	0.98079	0.89886	0.84293

SOURCE: Cowles, C.M., American Health Care Association.

0.98079 to 1.00351 in the Pacific and East South Central Divisions, respectively.

The passthrough cost audit ratios have the highest degree of overall variability as measured by comparatively large standard deviations. Passthrough cost audit ratios are broken out by urbanicity and census division in columns 6 and 7 of Table 3. Unlike the operating cost per case audit ratio, the passthrough audit ratios show a consistently greater urban than rural audit adjustment. Within six of the nine divisions, for both capital and medical education passthroughs, the mean urban audit adjustment was greater than the corresponding rural adjustment. Rural mean capital passthrough cost per case audit ratios ranged from 0.91002 in the Pacific Division to 0.98581 in the Middle Atlantic Division. The corresponding urban means ranged from 0.89866 to 0.966 in the Pacific and East North Central Divisions, respectively. For the medical education passthrough cost per case audit ratios, rural means ranged from 0.72271 in the Mountain Division to 1.02245 in the West North Central Division, and urban means ranged from 0.84293 to 1.00679 in the Pacific and Mountain Divisions, respectively.

The degree of accuracy sacrificed by using as-submitted PPS-1 year cost report data on the overall levels of Medicare days, Medicare discharges, Medicare operating costs per case, Medicare operating revenue per case, and total Medicare revenue per case appears small. The margin of error is, on average, less than 1 percent. Nonetheless, the use of as-submitted data might introduce systematic biases among different types of hospitals. Similarly, the application of mean audit ratios to as-submitted data might also introduce systematic bias. For example, if the audit and/or review process impact is

positively correlated with teaching activity, then applying the calculated mean audit ratios to as-submitted data will tend to underestimate the review process impact on teaching and overstate the impact on non-teaching hospitals. One method of examining these types of possibilities is ordinary least-squares (OLS) regression analysis. To the extent that the regression equations reveal no systematic effects, we might conclude that the average audit ratios are unbiased. If, on the other hand, the regression equations have strong predictive ability, then the equations might be used directly to adjust the as-submitted data. Additionally, the OLS might uncover some hitherto unrecognized relationship that could increase the effectiveness of the audit activity by focusing limited audit resources on hospitals with certain characteristics. In several ways then, this exercise has the potential to improve our understanding of the nature of the audit and/or review process by either explaining or failing to explain variation in review process impact across hospitals.

Regression analysis

Operating cost per case audit ratios, as well as other measures of the review process impact on operating costs, were regressed on sets of independent variables. As explanatory variables, we tried seemingly logical provider-specific file variables, including dummies for urban-rural, region, teaching status, FI, and some proxy variables intended to measure the likelihood that the auditor would "scope" the particular area under consideration for audit during the desk review. Unfortunately, the best Medicare operating cost regression equations had only a few marginally significant

independent variables and very low adjusted R^2 values. Accordingly, they are not reported. Perhaps there was too little variability in the dependent variable, or the equations could not capture systematic variation in the review process impact on Medicare operating costs because of misspecification. Nonetheless, the OLS failure provides some useful information. The mean Medicare operating costs per case audit ratio reported in Table 1 (which showed a 0.5-percent reduction) is probably unbiased or, if it is systematically biased, the bias is very well hidden.

Passthrough cost audit ratios demonstrate greater variation, and regression analysis proved more fruitful. Because more hospitals claim capital costs than medical education passthrough costs, passthrough cost regression analysis was limited to capital. Most capital passthrough cost audit exceptions result either from fraud or cost shifting. The following example of fraud was given by a retired FI auditor. When examining invoices for capitalized landscaping associated with a building addition to a hospital, he found a handwritten note on the back of one of the invoices instructing the truck driver to deliver one-half of the sod to another address. The stated address turned out to be the hospital administrator's residence. Naturally this finding resulted in an audit exception. The capitalized cost of the turf was halved and the cost report adjusted accordingly. Anecdotal evidence suggests that fraud is rare. Cost shifting is much more common. Cost shifting occurs when costs that rightfully belong in one category (typically operating cost) are shifted to some other category (in this case, capital passthrough costs), where, presumably, auditors will identify and reallocate the costs to the appropriate categories. The rules dictating which costs should be capitalized and which should be expensed are complex, providing sufficient gray area within which reasonable accountants may disagree. Because PPS created an incentive for hospitals to shift costs from the operating to passthrough categories, FI auditors were instructed to look for this type of cost shifting. Table 3 may be construed to provide evidence of cost shifting in the first year of PPS. Columns 5 and 6 of row 12, for example, appear to show that auditors found rural Pacific Division hospitals were inappropriately shifting Medicare operating costs to capital passthrough costs. After the audits, per discharge Medicare operating costs actually increased 2.5 percent and per discharge capital passthrough costs fell 9 percent. Other entries in Table 3 may also suggest cost shifting, but this issue was not analyzed specifically.

Table 4
Capital passthrough regression equation

Variable	Coefficient	t-ratio
a	29.27	14.54
X1	−4.37	−2.67
X2	−4.17	−26.26
X3	14.41	4.27
X4	−0.34	−0.05
X5	−13.96	−5.90

Adjusted R^2 = .2077

SOURCE: Cowles, C. M., American Health Care Association.

The best specification of the capital passthrough cost regression equation defined the dependent variable as the dollar difference between reviewed and as-submitted capital passthrough costs on a per discharge basis. Table 4 reports the OLS estimate of the equation:

$$Y = a + b1\,X1 + b2\,X2 + b3\,X3 + b4\,X4 + b5\,X5 + e$$

where

$$Y = \frac{\begin{array}{c}\text{reviewed Medicare}\\\text{capital passthrough}\\\text{costs}\end{array} - \begin{array}{c}\text{as-submitted Medicare}\\\text{capital passthrough}\\\text{costs}\end{array}}{\text{as-submitted Medicare discharges}}$$

a = Y intercept

$X1$ = as-submitted Medicare capital passthrough costs in millions of dollars

$X2 = \dfrac{\text{as-submitted Medicare capital passthrough costs}}{\text{as-submitted Medicare operating costs}} \times 100$

$X3$ = teaching status dummy variable equal to one for light-teaching hospitals

$X4$ = teaching status dummy variable equal to one for heavy-teaching hospitals

$X5$ = urban-rural dummy variable equal to one for urban hospitals

e = error

The most powerful predictor of the review process impact on Medicare capital passthrough costs is $X2$, which expressed capital passthrough costs as a percentage of operating costs. This variable was intended to identify hospitals whose capital costs are high relative to their operating costs. The higher the ratio, the greater the probability that as-submitted capital costs are overstated and would be adjusted downward during the field audit and/or the desk review. The equation predicts a $4.17 audit reduction to capital passthrough costs per case for each 1-percentage point increase in capital passthrough costs as a percent of operating costs.

Another important predictor variable is $X1$, the absolute magnitude of claimed capital passthrough costs. The absolute magnitude of claimed capital passthrough costs was included because the potential payoff to audit is greater, the more capital dollars are subject to audit. Presumably, the greater the costs, the more cost-effective the auditor perceives it to be; therefore, the more likely it is that costs will be examined during the audit process. The equation predicts a $4.37 reduction to capital passthrough costs per case for each $1 million increase in claimed capital passthrough costs.

The next two variables, $X3$ and $X4$, are teaching status dummy variables that trichotimize the observations into heavy, light, and non-teaching hospitals. (Light and heavy teaching hospitals are differentiated by whether their resident-to-bed ratio is less than or greater than 0.25.) Because teaching hospitals typically treat sicker patients with correspondingly higher costs, and because they may be more technologically advanced and have the latest diagnostic equipment (movable equipment), the impact of the audit and review process might be

systematically greater, the greater the amount of teaching activity. The coefficients for the teaching status dummy variables imply that a heavy-teaching hospital is not statistically different from a non-teaching hospital, but that a light-teaching hospital would be expected to experience $14-$15 less of an audit adjustment to Medicare capital passthrough costs per discharge than a non-teaching hospital. This appears to be somewhat counter-intuitive. On the one hand, more movable equipment might lead to a larger audit reduction. On the other hand, if capital equipment is being expensed, the correcting audit adjustments would increase capital costs, all other things being equal.

The urban-rural dummy variable $X5$ implies a $14 larger audit adjustment to capital passthrough costs per discharge for urban rather than rural hospitals. This finding is consistent with what was said about Table 3 previously. Perhaps the cost of audit effort, such as travel costs, is sufficiently greater for rural hospitals that the audit cost-benefit ratio is perceived to be higher by the FI. At any rate, the equation provides a starting point to test some hypotheses.

One of the hypotheses tested relates to FI impact. Other things held equal, does the audit adjustment to Medicare capital passthrough costs vary by FI? To shed some light on this possibility, 61 dummy variables representing the 62 FIs were stepped into the regression equation reported in Table 4. An F-value of 3.56 was calculated to test the possibility that the 61 FI dummy variables were improving equation specification. The calculated F-value is statistically significant at the appropriate number of degrees of freedom in the numerator and denominator. All of the FI effect can, it was found, be attributed to a single FI. One particular FI, operating in the mideastern seaboard area, made significantly larger desk review and audit adjustments to capital passthrough costs than was typical of the rest of the country. Therefore, in general, other things held equal, differences among FIs are not of practical significance.

Conclusion

Recall that the 1985 GAO study found that FI desk reviews and field audits produced a rather large percentage reduction to operating costs per case. Had the audit ratio implicit in GAO's numbers been applied to as-submitted PPS-1 operating costs per case, the effect would have been to severely overestimate the review process impact, which turned out to be only about one-half of 1 percent. Operating costs were reimbursed very differently during the GAO study period than they were in the PPS-1 year, and, consequently, the two different reimbursement schemes provided hospitals very different incentives to misrepresent operating costs on the cost report. Additionally, the Contractor Performance Evaluation Program and the Audit Program change over time, which changes the incentives of the audit team to find different kinds of errors. For example, operating costs were reimbursed in 1981 and 1982 in a way that was more analogous to how passthrough costs were paid in the PPS-1 year. This research found that the review process impact to passthrough costs per case in the PPS-1 year was very similar in magnitude to the review process impact GAO found for operating cost per case.

In summary, this study found that the audit and review process, on average, reduced all of the variables considered except Medicare operating revenue per case, which was shown to increase about one-half of 1 percent. With the notable exception of passthrough costs, the overall audit impact was small, typically only a fraction of 1 percent. In the capital passthrough cost area, it was found that when as-submitted capital passthrough costs increase relative to as-submitted operating costs, the likelihood that the as-submitted capital passthrough costs are overstated increases.

In general, the findings of this study regarding the impact of the audit and review process on Medicare cost report variables are analogous to a confidence interval, in the sense that they quantify precision and thereby loosely define the bounds of reasonable criticism that can be aimed at analyses based on as-submitted Medicare cost report data.

References

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