
Estimating Payment Error for Medicare Acute Care Inpatient Services

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CMS recently assumed responsibility for estimating the Medicare fee-for-service (FFS) error rate from the Office of the Inspector General (OIG). Here, the method used to calculate national, by State, and by error type, estimates for the inpatient acute care portion of this rate is presented. For fiscal years (FYs) 1998 and 2000 discharges, national estimates for the net error rate were 2.6 and 2.8 percent, respectively, about \$2 billion annually. Wide variation in State rates illustrates that estimates to the State level are essential for targeting and monitoring interventions to reduce improper Medicare inpatient acute care reimbursements.

INTRODUCTION

Reducing the percentage of improper Medicare FFS payments (Health Care Financing Administration, 2001) is an agency performance measure for CMS. For the first of these rates reported by the OIG (1996), inpatient acute care payments constituted 22.6 percent of a net \$18.3 billion FFS Medicare dollars paid in error during FY 1996, or about \$4.1 billion. By FY 1998, inpatient acute care hospital services were the largest source of improper Medicare FFS payments, accounting for 26.8 percent of \$13.5 billion net dollars in error, or about \$3.6 billion (Office of the Inspector General, 2000).

Inpatient acute care hospital services are addressed specifically under a comprehensive program integrity plan (Health Care

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Financing Administration, 1999) where CMS stated the intent to develop a system to measure and monitor national and State-level inpatient payment error rates based on medical review of randomly sampled inpatient charts. Such a system would enable CMS to target and monitor the effects of interventions to reduce improper payments. CMS assumed responsibility for calculating the Medicare FFS payment error rate from the OIG starting with the FY 2003 estimate (Health Care Financing Administration, 1999). To validate the surveillance system designed to meet the specifications described for the inpatient acute care portion of this rate, the extent and composition of improper payments for inpatient acute care FFS Medicare discharges during FYs 1998 and 2000 were estimated and compared with estimates derived from published OIG annual audits.

STUDY METHODS

The payment error surveillance and tracking system for inpatient acute care FFS Medicare payments was designed under the Sixth Peer Review Organization/Quality Improvement Organization (QIO) contract (Bhatia et al., 2000). For contractor evaluation under this scope of work, the sample sizes were planned to detect a 25 percent change in the rate of improper payments from FYs 1998 to 2000 within each State/jurisdiction with 90 percent confidence.

The FY 1998 sample consisted primarily of the National Diagnosis Related Group (DRG) Validation Study sample for FY

1998 (Office of the Inspector General, 1999) (discharge dates of October 1, 1997-September 30, 1998), which was a national sample of inpatient discharges not stratified by State. Since 1995, the Clinical Data Abstraction Centers (CDACs) have validated DRGs on an annual national sample of over 20,000 Medicare inpatient claims. As contractors for CMS, CDACs were established to provide standardized data abstraction of medical records for national health quality of care projects (Marciniak, Mosedale, and Ellerbeck, 1998). For those States that initially had fewer than 1,100 sampled records, a supplementary simple random sample was drawn to bring the minimum number of discharges sampled per State to 1,100.

For the FY 2000 sample, (discharge dates of October 1, 1999-September 30, 2000), 93 claims were randomly sampled for each State, for each month. The selection criteria specifically excluded critical access, psychiatric, and other prospective payment system (PPS)-exempt hospitals.

FY 2000 claims were sampled from the CMS National Claims History file, the database containing all claims paid by Medicare. Sampling was done after the completion of 3 months following the month of the discharge date to allow for complete billing. Interim bills were aggregated into one final action claim and the most recent final action claim was retained for sampling. Electronic, final action (patient has been discharged), FFS, non-health maintenance organization (HMO) inpatient, acute care hospital stay Medicare claims with a payment amount greater than zero were randomly sampled by the State/jurisdiction where the discharge occurred (all 50 States, Puerto Rico, and Washington, DC).

The delay from discharge date to sampling is necessary to obtain relatively complete reimbursements for discharges due

to interim billing and the allowed time to submit claims; Medicare providers have up to 27 months after the date of service to submit a claim. To investigate the completeness of final action claims, we examined all discharges during the first quarter of FY 2002 meeting the sampling criteria; 97.4 percent of final action claims were found to be submitted during the first 3 months following the month of discharge (unpublished data). Thus, while adjustments to claims are submitted after sampling, about 97 percent of final action claims are in the sampled universe. For example, for a discharge date in January, sampling would be done in May utilizing the universe of January discharge final action claims that consists of all interim bills associated with an individual discharge submitted through the end of April.

The medical record corresponding to each sampled discharge was requested from the hospital. The CDACs screened received medical records for admission necessity (medical necessity and appropriateness of setting) (InterQual Products Group, 2000), DRG coding validity, length of stay (LOS) (Maryland only), and quality concerns. There are two CDACs; each State/jurisdiction is assigned to one of the two with records assigned by the jurisdiction where the discharge occurred. Non-physicians perform admission necessity, quality-of-care, and LOS screenings. Coding staff conduct DRG validation by independently recoding the medical record. Records failing CDAC screening were forwarded to the QIO in the jurisdiction where the discharge occurred. Utilization review for medical care delivered to Medicare beneficiaries is conducted at the State/jurisdiction level by QIOs to account for local standards of practice (Tax Equity and Fiscal Responsibility Act of 1982, Public Law 97-248). For QIO review, a non-physician professional again

screened the medical record for admission necessity, DRG validation, LOS (Maryland only), and quality-of-care concerns. Records failing the QIO initial screen were referred to physician peer review in that QIO for final determination.

Records not received by a CDAC were referred to the appropriate QIO for followup. Under Medicare payment rules (*Code of Federal Regulations*, 2003) and consistent with OIG policy (Office of the Inspector General, 1996), lack of cooperation by a health care facility or practitioner by not responding to a request for information about a claim allows for denial of payment for that claim. Thus, if the QIO did not receive a medical record after a request, the services were considered undocumented and payment denied. In the DRG validation studies, non-received records were not subject to QIO-referral. From the original FY 1998 DRG Validation Study sample, there were 843 non-received records that were not subject to QIO referral and subsequent payment denial. These non-received records were excluded from all analyses.

For quality assurance of the screening/physician review process, a random, 10 percent sample of the medical records that passed CDAC screening were forwarded to the appropriate QIO. For all referred records, the referral reason was unknown to the reviewing QIO.

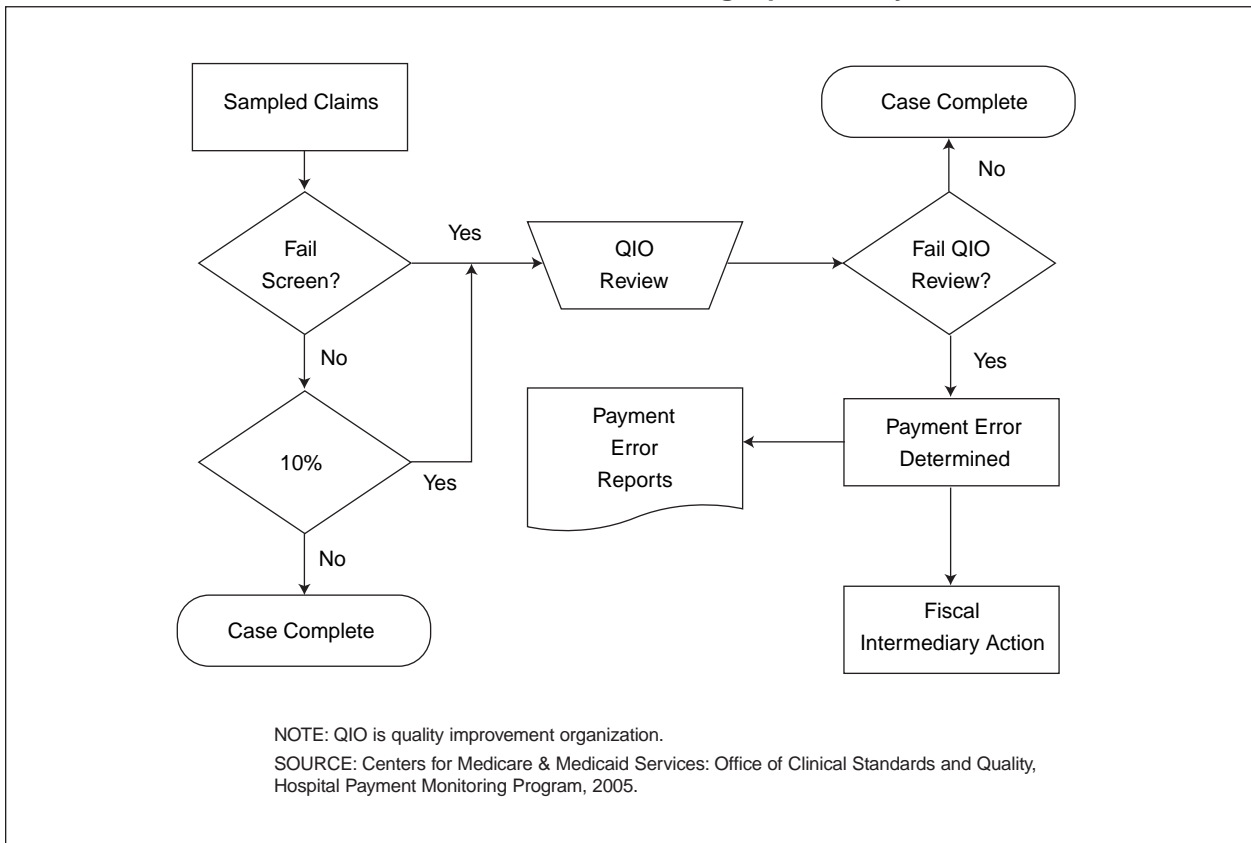
The inpatient acute care FFS payment error rate was defined as the percent of dollars paid in error out of the total dollars paid. Consistent with OIG policy (Office of the Inspector General, 1996), the number of dollars paid in error was defined as the net difference between what was paid and what should have been paid based on QIO review results. A positive net payment error rate, therefore, indicates overpayment by Medicare. For calculating the payment error rate for each State, the estimated numerator was the average payment

error amount from the sample multiplied by the number of discharges per State per year. The denominator was the dollar sum of the reimbursement amounts from the universe of discharges during the respective FY. The number of discharges per year meeting the sampling criteria and the sum of their reimbursements was determined from the universe of discharges obtained from the National Claims History database. The Improper Payments Information Act of 2002 (Public Law 107-300) includes the Medicare Program when stating that improper payments are both over and under payments, and that an estimate of the gross total of both over and under payments shall be calculated. Error rates and calculation of a 90-percent confidence interval (CI) accounting for both under and over payments by using the absolute value of the error amounts in place of the net amounts for the Nation and by State are available from the payment error surveillance and tracking system, but are not presented here.

Error amounts found in the quality assurance subsample were not included in the calculation of the error rate numerator. Figure 1 illustrates the decision flow chart for a sampled discharge through the surveillance system.

Improper payment amounts in the error rate calculation were determined from the electronically stored QIO review results. An algorithm determined the reimbursement amount that should have been paid for those claims determined to be errors. This algorithm utilizing the reimbursement amount on the sampled discharge, the QIO review determination, and any DRG outlier amounts permits accurate determination of the error amount independent of whether an adjustment submitted by a QIO was processed by the fiscal intermediary (FI), the Medicare contractor responsible for processing Part A payments for institutional

Figure 1
Data and Information Flow for Estimating Inpatient Payment Error



providers, including short-term acute care inpatient payments. Improper payments were classified as incorrect DRG coding, lack of medical necessity, billing errors, lack of documentation, or LOS concerns (for Maryland only as a non-PPS reimbursed State; as reimbursements are not based on DRGs, Maryland records do not have DRG coding errors). If a record determined to be medically unnecessary for inpatient admission included any other error, then it was considered solely as a lack of medical necessity error for calculation of the payment error amount. Billing errors included payments for claims where the stay was billed as non-exempt unit, but was exempt, outpatient billed as inpatient, and HMO bills paid under FFS. Lack of documentation errors include both insufficient documentation and lack of submission of the medical record.

For post-hoc stratified analysis by error type, weighted totals, standard errors for net payment error amounts, and analysis of design effects were calculated using SUDAAN® software (Shah, Barnwell, and Bieler, 2001). Reflecting the sampling methodology, the totals for FY 1998 were weighted by State and annual discharges, whereas those for FY 2000 were weighted by State and monthly discharges.

To estimate the inpatient payment error rate for FY 1998 (Office of the Inspector General, 2000) and FY 2000 (Office of the Inspector General, 2002) from the relevant OIG reports, the dollar amounts reported for medically unnecessary services, improper coding, and lack of documentation errors was multiplied by the percent error for inpatient services and then divided by the totals for the respective reports. FYs 1998 and 2000 estimates were derived

from the FYs 1999 and 2001 reports, respectively, as the selection weighting factors corresponded to the discharge timeframes of interest.

RESULTS

The national percentage of improper FFS Medicare payments for FY 1998 from the ratio estimate was 2.6 percent (90 percent CI: 2.4, 2.8 percent) and 2.8 percent (90 percent CI: 2.6, 3.0 percent) for FY 2000 (Table 1), with the two estimates not outside statistical variation. The post-stratification national estimate for FY 1998 discharges of 2.6 percent (Table 2) differed from the ratio estimate of 2.7 percent (Table 1), but was within standard error. Analysis of design effects for the FY 2000 sample revealed no significant effects for sampling stratification by month.

State Rates

There was considerable variation among the States in the rate of improper Medicare payments (Table 1). In FY 1998, the rates ranged from 0.4 percent in Vermont to 6.6 percent in Maryland. In FY 2000, the rates ranged from a low of -2.6 percent in Arizona to a high of 5.0 percent in Rhode Island. The variability across the States, as measured by the standard error, was identical for both years, 0.1 percent.

Payment Error Type

The largest dollar source of error for inpatient acute care, Medicare FFS payments, was medically unnecessary services (Table 2). DRG coding errors declined as a net source of improper payments from FYs 1998 to 2000 while billing errors, lack of documentation, and LOS concerns increased.

DISCUSSION AND POLICY IMPLICATIONS

Measuring Payment Error

The percentage of improper FFS Medicare payments attributable to acute care hospital, inpatient reimbursements remained steady at 2.6 percent in FY 1998 to 2.8 percent in FY 2000 of dollars reimbursed, about \$2 billion annually. These percents are proximate to estimates derived from OIG reports: 2.7 percent for FY 1998 and 2.6 percent for FY 2000 (Office of the Inspector General, 2000; 2002).

Medically unnecessary services constituted the vast majority of dollars paid in error for inpatient claims: 76.0 percent in FY 1998 and 80.6 percent in FY 2000. Net improper payments from DRG coding errors were much less costly, supporting the utility of the DRG system for payment of inpatient services reimbursed by Medicare.

Known differences in sampling strategy between the FYs 1998 and 2000 samples may underlie the decrease in the estimated total reimbursed dollars. The FY 1998 sample consisted primarily of the FY 1998 DRG Validation Study (Office of the Inspector General, 1999) and included a wider range of inpatient hospital claims. The sampling strategy utilized for the FY 2000 sample (and will be used onwards) was aimed at acute care hospital claims that met stricter criteria, e.g., final action, non-HMO, acute care inpatient hospital paid under PPS. While the estimated total dollars reimbursed decreased between the two fiscal years, there was a concomitant decrease in the number of dollars in error. Similarly, the difference in dollars paid in error for FY 1998 between here (\$2.1 billion) and that approximated from the OIG report (\$3.7 billion) could represent the magnitude

Table 1

Total Payments and Rate of Improper Payments for Prospective Payment System Inpatient Medicare Payments, by State: Fiscal Years 1998 and 2000

State	1998			2000				
	Sample	Total Payments	Error Rate (%)	90 % CI Semiwidth	Sample	Total Payments	Error Rate (%)	90 % CI Semiwidth
Nation	59,205	\$79,894,243,286	2.6	0.2	58,006	\$70,469,539,372	2.80	0.20
Alabama	1,071	1,508,381,894	2.0	0.9	1,115	1,367,285,472	3.50	0.90
Alaska	1,065	94,401,901	2.7	0.9	1,116	93,329,915	4.40	0.90
Arizona	867	834,043,206	4.0	8.6	1,116	787,038,938	-2.60	8.60
Arkansas	1,073	810,935,679	5.7	1.0	1,114	691,899,377	4.60	1.00
California	1,805	6,661,985,675	1.0	1.0	1,116	5,834,571,530	2.70	1.00
Colorado	1,084	657,637,002	3.5	0.9	1,116	553,897,545	0.50	0.90
Connecticut	1,063	1,135,616,758	2.0	1.5	1,116	950,739,976	4.10	1.50
Delaware	1,079	222,144,325	2.6	1.0	1,116	205,796,466	2.60	1.00
District of Columbia	1,069	436,419,616	3.3	2.4	1,116	387,656,555	0.30	2.40
Florida	1,853	4,806,513,049	2.6	0.8	1,116	4,547,706,504	2.10	0.80
Georgia	1,085	2,017,653,139	2.2	2.3	1,113	1,833,253,398	1.00	2.30
Hawaii	854	224,742,894	0.8	0.8	1,116	198,503,706	1.50	0.80
Idaho	1,080	228,631,059	2.6	5.0	1,116	216,157,055	1.90	5.00
Illinois	1,407	3,551,416,639	3.0	1.4	1,113	3,221,240,107	4.70	1.40
Indiana	1,085	1,778,295,174	4.1	1.0	1,115	1,599,453,060	3.40	1.00
Iowa	1,085	816,326,269	2.4	1.0	1,114	768,956,058	4.90	1.00
Kansas	1,071	719,486,515	1.2	0.7	1,115	649,315,862	0.70	0.70
Kentucky	1,085	1,267,297,103	4.2	0.9	1,116	1,215,153,973	3.80	0.90
Louisiana	1,051	1,498,324,407	2.3	0.8	1,116	1,166,058,331	3.20	0.80
Maine	1,087	400,326,061	1.1	1.0	1,116	378,941,213	2.80	1.00
Maryland	1,087	1,500,177,693	6.6	0.7	1,116	1,527,938,710	4.90	0.70
Massachusetts	1,050	2,174,244,267	4.7	3.1	1,116	1,809,953,400	3.50	3.10
Michigan	1,172	3,448,460,594	2.8	0.8	1,115	2,815,306,215	2.60	0.80
Minnesota	1,056	1,262,768,485	1.4	0.8	1,114	1,196,402,395	1.30	0.80
Mississippi	1,074	908,428,570	3.8	1.0	1,115	781,532,421	2.10	1.00
Missouri	1,078	1,978,246,651	1.5	1.0	1,115	1,631,598,202	1.40	1.00
Montana	1,092	231,210,634	1.0	0.5	1,116	227,297,800	0.70	0.50
Nebraska	1,070	477,513,119	2.9	0.6	1,116	470,364,842	3.10	0.60
Nevada	937	342,166,921	1.4	1.6	1,116	313,330,789	2.90	1.60
New Hampshire	1,060	298,167,235	1.1	0.9	1,116	283,164,130	1.00	0.90
New Jersey	1,090	2,894,949,797	1.8	1.0	1,116	2,716,132,787	3.00	1.00
New Mexico	975	283,319,420	4.4	1.1	1,116	251,483,063	2.90	1.10
New York	1,545	7,140,116,009	2.8	1.1	1,116	5,966,214,378	3.20	1.10
North Carolina	1,005	2,438,058,175	0.9	0.6	1,115	2,275,623,655	0.80	0.60
North Dakota	1,075	230,409,007	2.6	0.8	1,116	200,220,485	3.80	0.80
Ohio	1,364	3,529,487,109	3.2	1.0	1,114	2,952,454,029	4.40	1.00
Oklahoma	1,076	962,311,911	2.2	0.6	1,114	815,078,548	2.30	0.60

See footnotes at the end of the table.

Table 1—Continued

State	1998			2000				
	Sample	Total Payments	Error Rate (%)	90 % CI Semiwidth	Sample	Total Payments	Error Rate (%)	90 % CI Semiwidth
Oregon	895	\$625,431,266	2.6	0.8	1,116	\$549,090,186	2.50	0.80
Pennsylvania	1,782	4,892,486,406	2.0	1.1	1,116	3,827,255,299	3.40	1.10
Puerto Rico	1,089	336,228,793	3.2	1.1	1,116	338,324,270	4.20	1.10
Rhode Island	1,057	343,800,656	4.4	1.0	1,116	248,234,957	5.00	1.00
South Carolina	1,079	1,159,156,057	2.2	1.0	1,116	1,150,440,024	4.30	1.00
South Dakota	1,082	233,916,792	4.3	0.8	1,115	217,767,225	3.10	0.80
Tennessee	1,087	2,020,976,028	2.1	0.7	1,116	1,797,149,641	2.30	0.70
Texas	1,856	4,943,929,475	3.5	1.0	1,115	4,273,779,424	3.40	1.00
Utah	1,084	322,731,332	2.4	1.7	1,116	328,688,754	1.80	1.70
Vermont	1,085	143,779,649	0.4	0.7	1,116	144,727,831	1.80	0.70
Virginia	1,082	1,742,793,496	1.8	1.5	1,116	1,634,519,550	0.50	1.50
Washington	1,043	1,085,889,798	2.5	0.7	1,116	1,001,415,214	2.90	0.70
West Virginia	1,089	714,465,645	3.4	0.8	1,116	673,487,954	2.80	0.80
Wisconsin	1,082	1,464,299,415	2.9	0.8	1,115	1,287,577,234	2.90	0.80
Wyoming	1,088	93,744,516	0.9	0.8	1,116	96,030,919	1.50	0.80

NOTES: CI is confidence interval. The semiwidth is 1.645 times the standard error of the estimate.

SOURCE: Centers for Medicare & Medicaid Services: Office of Clinical Standards and Quality, Hospital Payment Monitoring Program, 2005.

Table 2
Post-Stratification Analysis for Estimated Totals and Improper Payments, by Type of Error: Fiscal Years 1998 and 2000

Item	1998			2000				
	Original Payments	Net Error	Standard Error	% of Total Net Error	Original Payments	Net Error	Standard Error	% of Total Net Error
Total	\$77,061,035,984	2,063,518,763	89,879,593	100.0	\$71,446,832,009	1,988,303,722	105,862,782	100.0
No Error	72,246,991,360				66,255,776,705			
Incorrect Coding	2,684,940,901	180,228,831	66,143,318	8.7	2,845,394,372	-17,406,733	84,337,823	-0.9
Lack of Medical Necessity	1,567,992,967	1,568,006,862	52,971,275	76.0	1,602,394,386	1,602,394,386	55,703,087	80.6
Billing	131,017,665	121,400,885	15,475,539	5.9	266,148,141	197,958,631	23,561,788	10.0
Lack of Documentation	140,852,763	140,852,763	25,437,392	6.8	149,199,021	149,199,021	21,094,141	7.5
Length of Stay ¹	289,240,329	53,029,421	6,577,071	2.6	327,919,386	56,158,418	5,392,403	2.8
Rate of Improper Payments (%)	—	2.7	—	—	—	2.8	—	—

¹ For Maryland only.

SOURCE: Centers for Medicare & Medicaid Services: Office of Clinical Standards and Quality, Hospital Payment Monitoring Program, 2005.

of difference in the total dollars included in the respective denominators due to sampling criteria restrictions.

The increase in the amount of payment error due to lack of documentation between FYs 1998 and 2000 partially reflects that records initially selected for the FY 1998 DRG Validation Study not received by a CDAC were not subject to payment denial; when these records were requested there was no policy to issue denial of payment for non-receipt. Policy for any record request to providers past the FY 1998 DRG Validation sample was to deny payment for non-receipt.

The philosophy and methodologies of the payment error surveillance and tracking system and those of the OIG's annual audit are similar; payment error rates are estimated from records sampled from reimbursed claims that underwent QIO review. Methodological differences between the two approaches allow estimation at different levels (State level versus national), category of service (inpatient only versus all types of FFS payments), and degree of payment error category delineation. The sampling strategy employed by the OIG audit was designed to estimate a national rate for all FFS payments and was not designed to have the precision to estimate error amounts for any specific provider type or State on an annual basis. The system described here provides ongoing measurement to the individual State level for one class of FFS payments, inpatient acute care. Further, the OIG's audit does not separate out LOS concerns, a concern specific to Maryland as a non-PPS State, quality of care issues, or billing errors.

The OIG computed the percentage of improper payments for FFS Medicare reimbursements for FYs 1996-2002 as part of the chief financial officer audit of CMS.

CMS assumed responsibility for measuring the Medicare FFS error rate beginning FY 2003 (Health Care Financing Administration, 1999; Centers for Medicare & Medicaid Services, 2003). The surveillance system described here was used for calculating the inpatient, acute care FFS portion of the FY 2003 FFS Medicare payment error rate.

Reducing Payment Error

Under the Government Performance Results Act, CMS is to continue reducing the percentage of improper payments made under the FFS program (Health Care Financing Administration, 2001). This means paying the correct amount to the correct provider for covered, reasonable, and necessary services provided to eligible beneficiaries (Health Care Financing Administration, 1999). Under their sixth contract cycle, QIOs implemented improvement projects aimed at reducing the inpatient acute care payment error rate (Bhatia et al., 2000). The full effects of these QIO efforts on the inpatient payment error rate have likely not been realized. It is not known how low an inpatient payment error rate is achievable, but the individual State estimates indicate that very low rates are possible. However, while an error rate of 2.5 percent means 97.5 percent of all inpatient FFS claims would be correctly paid, this would still comprise \$2 billion per year in improper payments.

Program Cost Analysis

For the sixth QIO contract cycle, the costs of the surveillance system were an estimated \$9.7 million per year. About \$2 million was attributable to medical record screening by the CDACs, \$7 million represented

medical review costs to the QIOs, and the remaining \$0.7 million provided system support and maintenance costs.

All sampled medical records referred to the QIOs for medical review were subject to possible payment adjustment and QIOs submitted all payment adjustments to the appropriate Medicare FI. From the estimated over and under payments referred to the FIs there was a total savings to the Medicare Program of \$10.7 million in the FY 1998 sample and \$11.2 million in the FY 2000 sample.

The program goal is to reduce improper payments for Medicare FFS payments. Direct savings from error reductions at this level are sustainable, but are dependent on the amount of dollars improperly paid.

State Level Estimation and Variation

The surveillance system outlined here enables State-level measurement as specified in CMS' comprehensive integrity plan (Health Care Financing Administration, 1999). State-level measurement allows concurrent evaluation of the impact of State-based interventions on the national inpatient error rate. Variability across States suggests that the payment error rate for inpatient services can be lower. However, differences between States may reflect QIOs making different decisions about what is or isn't an improper payment rather than differences in medical practice or what the true error rate is for a State. For example, Arizona was the only jurisdiction with a negative error rate (has more under than over payments) for the two fiscal years reported. As underpayments can only result from DRG errors, to what extent Arizona was an outlier from the perspective of the State's providers, QIO, or the coders there has yet to be determined but is beyond the scope of this article.

Data Limitations

As the discharges sampled were restricted to those reimbursed under inpatient, non-HMO, Medicare FFS, the payment error rate calculated pertains only to this reimbursement type. Further, the amount of actual funds recouped from claims found to have payment errors was not determined. Whether the FI processed an adjustment submitted by a QIO was not determined in these analyses and is the subject of future program review and evaluation.

CONCLUSION

The CMS estimates for the national rate of improper payments for FYs 1998 and 2000 inpatient acute care FFS Medicare discharges are proximate to what can be estimated from relevant OIG annual fiscal audit data. Further, the CMS payment error surveillance and tracking system can provide ongoing, individual State inpatient acute care payment error rates and rates by payment error type. State-level information is necessary for designing and measuring the effects of targeted interventions to reduce such payment errors. Despite the immediate limitation to a single type of Medicare payment, the surveillance system described is a model system for measuring, monitoring, and providing the data basis for targeting interventions for payment errors of other classes of FFS payments.

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