

Department of Health and Human Services

**OFFICE OF
INSPECTOR GENERAL**

**DRG 14 VALIDATION UPDATE:
SPECIFIC CEREBROVASCULAR
DISORDERS EXCEPT TRANSIENT
ISCHEMIC ATTACKS**



AUGUST 1992

OFFICE OF INSPECTOR GENERAL

The mission of the Office of Inspector General (OIG), as mandated by Public Law 95-452, as amended, is to protect the integrity of the Department of Health and Human Services (HHS) programs as well as the health and welfare of beneficiaries served by those programs. This statutory mission is carried out through a nationwide network of audits, investigations, and inspections conducted by three OIG operating components: the Office of Audit Services, the Office of Investigations, and the Office of Evaluations and Inspections. The OIG also informs the Secretary of HHS program and management problems and recommends courses to correct them.

OFFICE OF AUDIT SERVICES

The OIG's Office of Audit Services (OAS) provides all auditing services for HHS, either by conducting audits with its own audit resources or by overseeing audit work done by others. Audits examine the performance of HHS programs and/or its grantees and contractors in carrying out their respective responsibilities and are intended to provide independent assessments of HHS programs and operations in order to reduce waste, abuse, and mismanagement and to promote economy and efficiency throughout the Department.

OFFICE OF INVESTIGATIONS

The OIG's Office of Investigations (OI) conducts criminal, civil, and administrative investigations of allegations of wrongdoing in HHS programs or to HHS beneficiaries and of unjust enrichment by providers. The investigative efforts of OI lead to criminal convictions, administrative sanctions, or civil money penalties. The OI also oversees State Medicaid fraud control units which investigate and prosecute fraud and patient abuse in the Medicaid program.

OFFICE OF EVALUATION AND INSPECTIONS

The OIG's Office of Evaluation and Inspections (OEI) conducts short-term management and program evaluations (called inspections) that focus on issues of concern to the Department, the Congress, and the public. The findings and recommendations contained in these inspection reports generate rapid, accurate, and up-to-date information on the efficiency, vulnerability, and effectiveness of departmental programs.

Amy L. Lockwood of BOTEC Analysis Corporation prepared this report under the direction of Janet W. Knight, BOTEC Project Director, and David C. Hsia, OIG Project Officer. Contract information and project participants are listed in Appendix 1 to this inspection.

Department of Health and Human Services

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AUGUST 1992 OEI-12-89-00192

EXECUTIVE SUMMARY

PURPOSE

This inspection reabstracted on a blinded basis, the International Classification of Diseases, 9th Edition, Clinical Modification (ICD-9-CM) codes from a sample of Medicare discharges billed as diagnosis-related group (DRG) 14. It compared the resulting DRG to the hospital DRG for reimbursement changes. The sample was nationally representative and covered all of 1988, the most recent data available.

This inspection updated two previous Office of Inspector General (OIG) studies. For 1984, the OIG found 15.5 percent errors among 355 reabstractions, improperly over-reimbursing hospitals by a projected \$31.5 million. For 1985, the OIG found 15.8 percent errors among 217 DRG 14 reabstractions, over-reimbursing hospitals an estimated \$56.5 million. This inspection used a parallel methodology to make these studies statistically comparable.

FINDINGS

DRG 14 coding error reduced: Of 145 discharges reabstracted for this inspection, 1.4 percent had coding errors. This proportion statistically significantly improved over the 15.5 percent for 1984 and the 15.8 percent for 1985. This proportion also statistically significantly improved over the 14.7 percent error rate previously reported for all 1988 DRGs. This inspection's low proportion of errors precluded identifying risks by hospital or patient demography.

Financial impact of DRG 14 coding error reduced: This inspection projected that DRG 14 under-reimbursed hospitals a nonsignificant \$9.3 million. This result contrasts with the statistically significant \$31.5 million over-reimbursement of the 1984 Inspection and \$56.6 million over-reimbursement of the 1985 Study.

AGENCY COMMENTS

In its June 10, 1992 comments to the draft of this inspection, the Health Care Financing Administration (HCFA) concurred with the OIG's findings. The HCFA made several technical comments. Based on these comments, the OIG made changes to this report. The full text of the HCFA comments appear as an appendix.

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INTRODUCTION

BACKGROUND

As a principal diagnosis, 11 International Classification of Diseases, 9th Edition, Clinical Modification (ICD-9-CM) codes group to diagnosis-related group (DRG) 14. These ICD-9-CM codes identify disorders involving strokes or cerebrovascular accidents. A stroke occurs because of a blockage in the blood supply to the brain. The subsequent loss of brain cells may cause weakness, paralysis, loss of sensation, and cognitive disturbances. Three pathologies account for most of these blockages. [Appendix 2].

THROMBOSIS A blood clot forms in an artery of the brain.

EMBOLUS A blood clot forms elsewhere in the body, usually the heart or neck, and travels to the brain.

HEMORRHAGE A weak point in a brain artery allows blood to leak out.

Since 1985, the Health Care Financing Administration (HCFA) has made no title, code, or hierarchy changes to DRG 14. Its Relative Weight has undergone downward adjustment because of decreased resource consumption, from 1.3386 in 1985 to 1.2429 in 1988.

In previous studies from the Office of the Inspector General (OIG), U.S. Department of Health and Human Services (HHS), DRG 14 had a disproportionately high rate of coding errors. Proper selection of ICD-9-CM codes would have grouped these discharges to DRGs with lower average Relative Weights. This significant over-reimbursement to hospitals, DRG 14's high Relative Weight, and its apparent vulnerability to miscoding invited OIG attention.

- In 1988, the OIG released its inspection of 355 DRG 14 discharges from 10 hospitals during 1984.¹ The reabstraction of medical records found a 15.5 percent errors. Extrapolating the financial impact of these errors to the national population, the study estimated that DRG 14 errors caused \$31.5 million in over-reimbursement to hospitals.
- In 1987, the OIG released its National DRG Validation Study, that reabstracted a sample of medical records representing all prospective-payment system discharges during 1985.² The 1985 Study included 217 DRG 14 reabstractions, with 15.8 percent errors. Upon national projection, these DRG 14 errors over-reimbursed hospitals an estimated \$56.5 million.

This inspection updated the 1984 and 1985 data with medical records from calendar year (CY) 1988, the most recent data available. It used a parallel methodology to

make these studies statistically comparable.

METHODOLOGY

This inspection randomly selected 145 DRG 14 discharges from 144 hospitals. The study population consisted of the 331,550 DRG 14 Medicare reimbursed discharges for CY 1988. The design excluded discharges from specialty institutions such as children's hospitals, tuberculosis units, and psychiatric facilities. It also excluded discharges in Maryland and New Jersey, which the PPS still exempted in 1988. It excluded bills for pediatric, obstetric, and psychiatric DRGs (principally drug and alcohol rehabilitation performed by a general hospital).³

The OIG requested that hospitals send complete copies of the sampled medical records to the OIG's contractor, Health Data Institute (HDI) of Lexington, Massachusetts. It followed-up missing records and issued subpoenas to compel the cooperation of four hospitals.

The OIG contracted with the American Medical Record Association (AMRA) to reabstract the charts. The AMRA selected the ICD-9-CM codes supported by the record, determined the principle diagnosis, and grouped to select the correct DRG. To assure that the original ICD-9-CM codes and DRGs did not affect this reabstraction, the AMRA coders conducted their work without knowledge of the original ICD-9-CM codes and DRGs. The coders had instructions not to treat marginal problems or honest differences in judgement about appropriate coding as DRG errors. This standard should have produced a conservative estimate of the proportion of discharges having DRG errors. A series of reliability checks verified the reproducibility and accuracy of the AMRA coding.

BOTEC Analysis Corporation of Cambridge, Massachusetts (BOTEC) edited the database, checked the sample's representativeness, and conducted statistical analyses of the correlates and financial consequences of DRG 14 miscoding.

SAMPLE REPRESENTATIVENESS

The sample accurately represented the characteristics of the underlying population of discharges. [Appendix 3].

Distributed by hospital demography, it did not differ from the DRG 14 population in bed size, teaching status, metropolitan location, or control. [Figure 1].

Distributed by patient demography, it did not differ by age, sex, or race. [Figure 2].

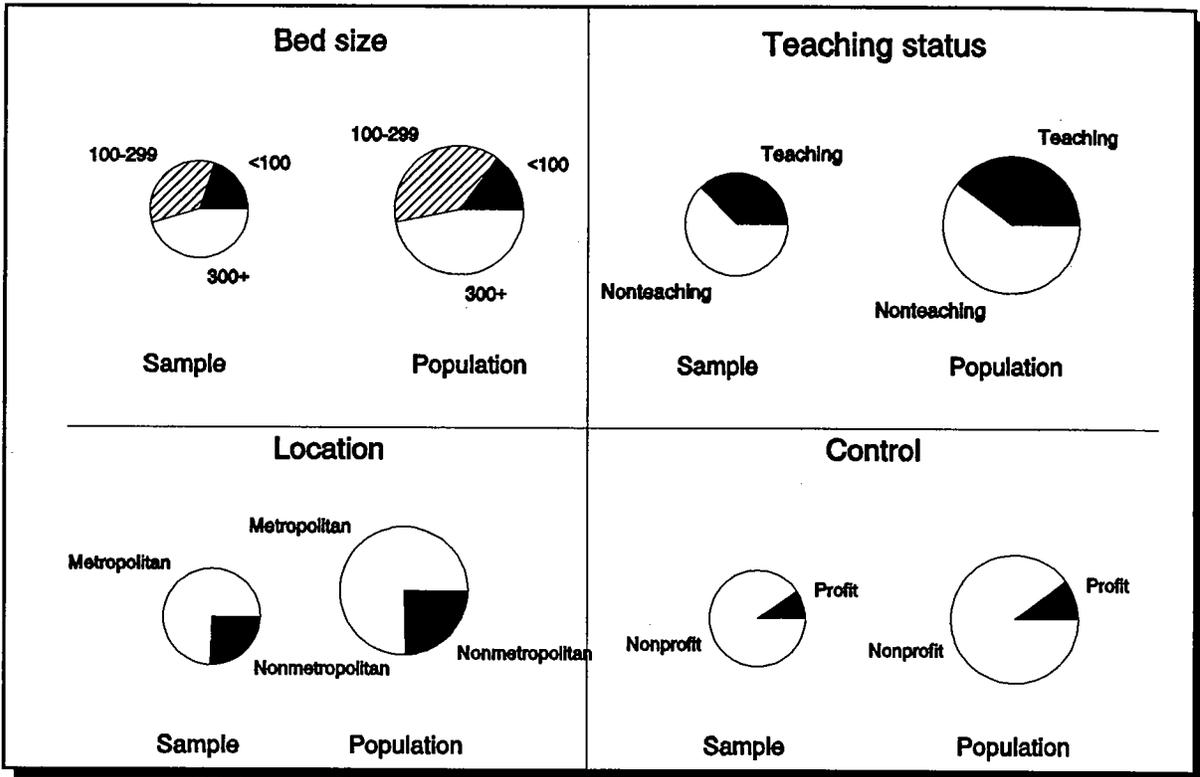


Figure 1: Sample representativeness by hospital demography, 1988

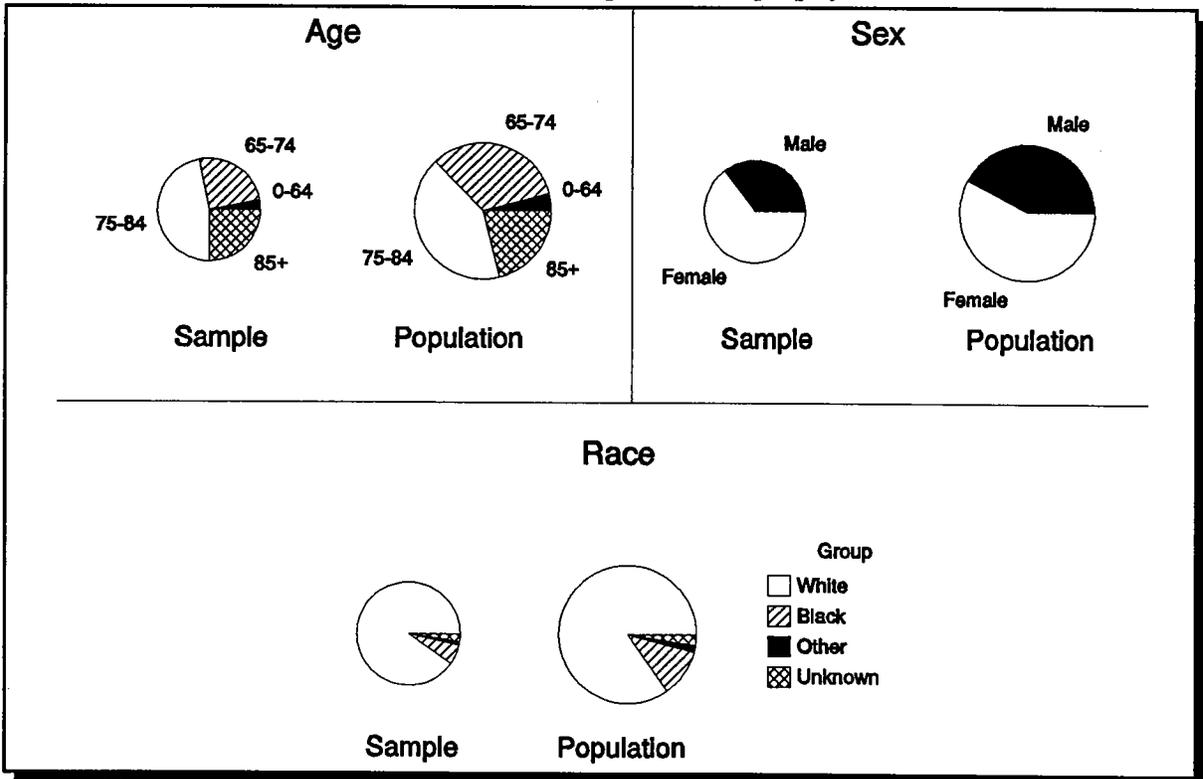


Figure 2: Sample representativeness by patient demography, 1988

FINDINGS

DRG 14 CODING ERROR REDUCED

Of the 145 sample discharges, only 1.4 percent had coding errors that changed their reimbursement from DRG 14. This proportion significantly improved over the 15.5 percent errors for 1984 and the 15.8 percent errors for 1985. [Figure 3].

This inspection's low proportion of errors precluded identifying risks by hospital or patient demography. However, the improvement in coding accuracy remained significant across all hospital and patient demographic categories. [Appendix 4].

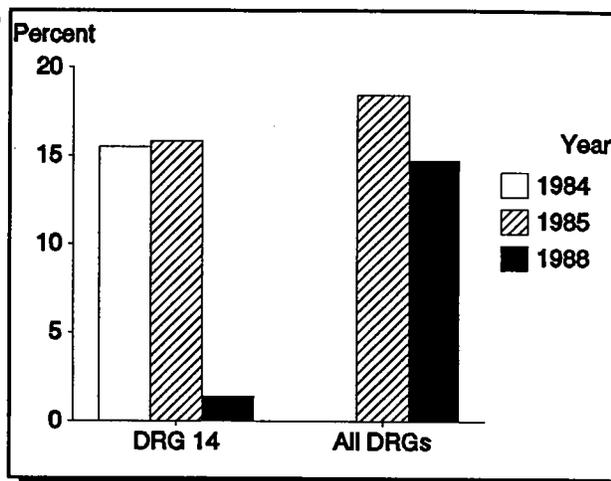


Figure 3: Proportion of discharges with DRG coding errors, DRG 14 and all DRGs, 1984-1988

This inspection's 1.4 percent DRG 14 errors also significantly improved over the 14.7 percent errors previously reported for all 1988 DRGs. Additionally, DRG 14's 14.3 percent improvement in coding accuracy between 1985 to 1988 significantly exceeded all DRG's 6.1 percent improvement. This difference also remained significant across all hospital and patient demographic categories. [Appendix 5].

DRG 14 OVER-REIMBURSEMENT ELIMINATED

The 145 sample discharges all originally received a Relative Weight of 1.2429, equivalent to \$3,797 (assuming an average Standardized Amount of \$3,055). This Relative Weight did not differ significantly from the 1.2521 case-mix index (CMI) after AMRA reabstraction, equivalent to \$3,825. In contrast, for 1985 DRG 14 reabstraction identified significant over-reimbursement to the hospitals. Hospital and patient demography did not affect these results. [Figure 4].

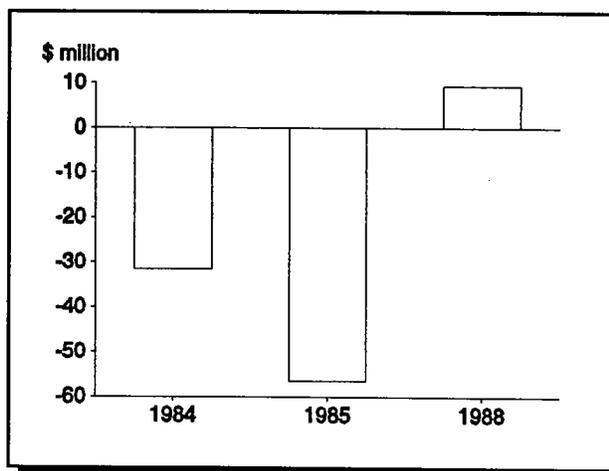


Figure 4: Financial impact of miscoding DRG 14, 1984-1988

Extrapolating the 1988 CMI change to all 331,550 DRG 14 bills, miscoding under-reimbursed hospitals a nonsignificant \$9.3 million. This result differs significantly from

the \$31.5 million over-reimbursement reported for 1984 and the \$56.6 million over-reimbursement estimated for 1985. [Appendix 6].

DRG 14 accounted for 13.3 percent of the \$69.8 million in net under-reimbursement for all DRGs in 1988.

REASONS FOR DRG CODING ERROR RANDOM

Only two of the sample discharges grouped to other DRGs after AMRA reabstraction. One case failed to attest to the traumatic causation of the cerebral event while the other appears to be a clerical error, substituting DRG 14 for DRG 148. No systematic miscoding appeared among the sample's bills.

The sample size sufficed to establish that DRG 14 no longer has significant miscoding, but could not identify any patterns by hospital or patient demography. To determine demographic trends would require a sample of approximately 2,500 medical records. The nonsignificant proportion of coding errors does not warrant such a study.

ENDNOTES

1. Purvis T, Carlson R, Fagan A, Jew M, Stewart S, Brown F, & Gannon C. Validation of DRG 14. San Francisco, CA: HHS Office of Inspector General, 1988. Inspection no. OAI-09-86-00052.
2. Delaney AM & Hsia DC, eds. National DRG Validation Study. Lexington, MA: Health Data Institute, 1987. Contract HHS-100-87-0015.
3. Knight JW & Hsia DC, eds. National DRG Validation Study Update: Technical Report. Washington, DC: HHS Office of Inspector General, 1992. Inspection no. OEI-12-90-00191.

Appendix 1: Project participants

OIG

Cathaleen A. Ahern, B.A.
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-
1. Now at Health Audit Services, Ellicott City, MD.
 2. Now at the Journal of the American Medical Association, Chicago, IL.
 3. Now at Johns Hopkins Medical Institutions.
 4. Ceased operations February 16, 1990.

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Contract information

Contractor

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Project Officer

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Contract

HHS-100-90-0023
Firm-fixed price contract
\$203,257

5. Outside contractor.

Appendix 2: ICD-9-CM codes in DRG 14

- 430 Subarachnoid hemorrhage
- 431 Intracerebral hemorrhage
- 432.0 Nontraumatic extradural hemorrhage
- 432.1 Subdural hemorrhage
- 432.9 Intracerebral hemorrhage, not otherwise specified
- 434.0 Cerebral thrombosis
- 434.1 Cerebral embolism
- 434.9 Cerebral artery occlusion, not otherwise specified
- 436 Cerebrovascular accident
- 437.3 Nonruptured cerebral aneurysm
- 784.3 Aphasia

Appendix 3: Sample representativeness

Number [percent]	Population	Sample	Chi-square
<u>Hospital demography</u>			
1-99 beds	49,645 [15.0]	29 [20.0]	2.1, 2 df, P=0.640
100-299 beds	125,856 [38.0]	50 [34.5]	
300+ beds	156,016 [47.1]	66 [45.5]	
Metropolitan	249,967 [75.4]	108 [74.5]	0.0, 1 df, P=0.150
Nonmetropolitan	81,583 [24.6]	37 [25.5]	
Teaching	131,367 [39.6]	54 [37.2]	0.2, 1 df, P=0.372
Nonteaching	200,183 [60.4]	91 [62.8]	
Profit	32,954 [10.1]	14 [9.7]	0.0, 2 df, P=0.020
Nonprofit	292,022 [89.9]	131 [90.3]	
<u>Patient demography</u>			
0-64 years	13,769 [4.2]	5 [3.4]	3.4, 3 df, P=0.658
65-74 years	109,174 [32.9]	36 [24.8]	
75-84 years	137,898 [41.6]	68 [46.9]	
85+ years	70,709 [21.3]	36 [24.8]	
Male	139,865 [42.2]	51 [35.2]	2.0, 1 df, P=0.835
Female	191,685 [57.8]	94 [64.8]	
White	280,550 [84.6]	131 [90.3]	2.7, 3 df, P=0.559
Black	36,600 [11.0]	9 [6.2]	
Other	5,144 [1.6]	2 [1.4]	
Unknown	9,256 [2.8]	3 [2.1]	
Total	331,550 [100.0]	145 [100.0]	not applicable

Appendix 4: DRG 14 coding errors by hospital and patient demography, 1984-1988

Proportion ± standard error (n)	1984	1985	1988
<u>Hospital demography</u>			
1-99 beds	20.0 ± 13.3 (10)	30.8 ± 5.3 (78)	3.4 ± 3.4 (29)
100-299 beds	17.1 ± 4.2 (85)	13.4 ± 4.2 (67)	2.0 ± 2.0 (50)
300+ beds	14.6 ± 2.2 (260)	12.5 ± 3.9 (72)	0.0 ± 0.0 (66)
Metropolitan		13.2 ± 3.4 (133)	0.9 ± 0.9 (108)
Nonmetropolitan		26.1 ± 10.1 (84)	2.7 ± 2.7 (37)
Teaching		10.5 ± 3.5 (61)	0.0 ± 0.0 (54)
Nonteaching		15.4 ± 3.3 (156)	2.2 ± 1.5 (91)
Profit		4.9 ± 2.3 (16)	0.0 ± 0.0 (14)
Nonprofit		16.4 ± 2.7 (201)	1.5 ± 1.1 (131)
<u>Patient demography</u>			
0-65 years		4.2 ± 2.6 (14)	0.0 ± 0.0 (5)
65-74 years		13.5 ± 4.7 (78)	5.6 ± 3.9 (36)
75-84 years		19.9 ± 4.3 (85)	0.0 ± 0.0 (68)
85+ years		21.9 ± 9.5 (40)	0.0 ± 0.0 (36)
Male		14.2 ± 3.9 (103)	0.0 ± 0.0 (51)
Female		18.2 ± 3.6 (114)	2.1 ± 1.5 (94)
White			1.5 ± 1.1 (131)
Black			0.0 ± 0.0 (9)
Other			0.0 ± 0.0 (2)
Unknown			0.0 ± 0.0 (3)
Total	15.1 ± 1.9 (355)	15.8 ± 2.6 (217)	1.4 ± 1.0 (145)
1988 difference [95% CI]	14.1 [8.0 to 20.3]	14.3 [8.0 to 20.6]	NA

Appendix 5: Coding errors by hospital and patient demography, 1988

Proportion \pm standard error (n)	DRG 14	All DRGs
<u>Hospital demography</u>		
1-99 beds	3.4 \pm 3.4 (29)	17.0 \pm 2.0 (359)
100-299 beds	2.0 \pm 2.0 (50)	14.9 \pm 1.2 (893)
300+ beds	0.0 \pm 0.0 (66)	13.9 \pm 1.0 (1199)
Metropolitan	0.9 \pm 0.9 (108)	14.9 \pm 0.8 (1845)
Nonmetropolitan	2.7 \pm 2.7 (37)	14.4 \pm 1.4 (606)
Teaching	0.0 \pm 0.0 (54)	15.5 \pm 1.1 (1008)
Nonteaching	2.2 \pm 1.5 (91)	14.2 \pm 0.9 (1443)
Profit	0.0 \pm 0.0 (14)	17.3 \pm 2.3 (272)
Nonprofit	1.5 \pm 1.1 (131)	14.4 \pm 0.8 (2179)
<u>Patient demography</u>		
0-65 years	0.0 \pm 0.0 (5)	16.4 \pm 2.4 (232)
65-74 years	5.6 \pm 3.9 (36)	14.9 \pm 1.1 (1007)
75-84 years	0.0 \pm 0.0 (68)	14.6 \pm 1.2 (854)
85+ years	0.0 \pm 0.0 (36)	13.4 \pm 1.8 (358)
Male	0.0 \pm 0.0 (51)	14.5 \pm 1.1 (1094)
Female	2.1 \pm 1.5 (94)	14.9 \pm 1.0 (1357)
White	1.5 \pm 1.1 (131)	14.8 \pm 0.8 (220)
Black	0.0 \pm 0.0 (9)	14.4 \pm 2.6 (188)
Other	0.0 \pm 0.0 (2)	14.3 \pm 6.0 (35)
Unknown	0.0 \pm 0.0 (3)	8.7 \pm 6.0 (23)
Total	1.4 \pm 1.0 (145)	14.7 \pm 0.7 (2451)
Difference [95% CI]	13.3 [7.5 to 19.2]	

Appendix 6: Financial effect of coding errors, 1985-1988

	<u>DRG 14</u>		<u>All DRGs</u>
	1985	1988	1988
<u>CMI</u>			
Before	1.3386 ± 0.0000	1.2429 ± 0.0000	1.3080 ± 0.0166
After	1.2383 ± 0.0299	1.2521 ± 0.1742	1.3104 ± 0.0186
Change	-0.1003 ± 0.0299	0.0092 ± 0.1742	0.0024 ± 0.0352
[95% CI]	[0.0601 to 0.1121]	[-0.2506 to 0.2322]	
<u>\$</u>			
Before	3542 ± 0	3797 ± 0	3996 ± 51
After	3277 ± 79	3825 ± 532	4003 ± 57
Change	-265 ± 79	28 ± 532	7 ± 108
Bills	191,654	331,550	9,506,361
\$ million change	-56.6	9.3	69.8
<u>Difference</u>			
CMI		0.1095	0.0068
Mean \$		293	21
Total \$ million		60.1	60.4

Appendix 7: HCFA comments



DEPARTMENT OF HEALTH & HUMAN SERVICES

Health Care
Financing Administration

JUN 10 1982

Memorandum

Date *William Toby, Jr.*
William Toby, Jr.
From Acting Administrator

Subject **OIG Draft Report: "DRG 14 Validation Study Update: Specific Cerebrovascular Disorders Other Than Transient Ischemic Attacks," OEI-12-89-00192**

To **Inspector General
Office of the Secretary**

We have reviewed the subject draft report which examines the coding accuracy of prospective payment discharges billed as Diagnosis Related Group (DRG) 14. In previous studies, the Office of Inspector General (OIG) sampled DRG 14 and found upcoding that resulted in over-reimbursement to hospitals of \$31.5 million in 1984 and \$56.5 million in 1985.

The findings of this report show a significant improvement in coding accuracy for DRG 14: from a little over 84 percent in 1984 and 1985, to 98.6 percent in 1988. The few remaining coding errors no longer result in systematic over-reimbursement of hospitals. Consequently, this report contains no recommendations for further action.

The Health Care Financing Administration is pleased with OIG's findings. We are in agreement with the report, and have only a few brief comments for further consideration by OIG.

Thank you for the opportunity to review and comment on this draft report. Please advise us whether you agree with our comments on the report at your earliest convenience.

Attachment

Comments of the Health Care Financing Administration (HCFA)
on OIG Draft Report: "DRG 14 Validation Study Update:
Specific Cerebrovascular Disorders Other Than
Transient Ischemic Attacks," OEI-12-89-00192

Technical Comments

Pages 2 and 3. The series of graphs on these pages are difficult to read because of their small size. We recommend increasing their size in the final report.

Page 4, "DRG 14 Over-Reimbursement Eliminated" section. It is not clear how the following underlined statements were assumed:

The 145 sample discharges all originally received a Relative Weight of 1.2429, equivalent to \$3,797. This Relative Weight did not differ significantly from the 1.2521 case-mix index (CMI) after AMRA re-abstraction, equivalent to \$3,825.

The relative weight is a constant multiplier, but the multiplicand varies according to each hospital's specific portion. We understand there were 144 hospitals in this study. Therefore, the origins of these values should be explained as an average, median, mean or actual figure, as appropriate.

Page 8, Appendix 1. Project participant Rita Finnegan, RRA, is now a self-employed consultant. Participant Delsa Mancilla, ART, is no longer employed by AMRA; her current position is not known.



9203301330

OBA: ACTION

DEPARTMENT OF HEALTH & HUMAN SERVICES cc:Hudson;AAO:AAPOffice of Inspector General
OLP:MB:OPHC:AAM:AAC: Means; Somsak; Schmidt; Thomas

MAR 30 1992

ADMINISTRATOR SIG. DUE 4/25/92 **Memorandum**

Date

From Richard P. Kusserow
Inspector General

For Bryan Mitchell

Subject

OIG Draft Report: "DRG 14 Validation Study Update: Specific Cerebrovascular Disorders Other Than Transient Ischemic Attacks," OEI-12-89-00192

To

J. Michael Hudson
Acting Administrator
Health Care Financing Administration

Attached is a draft inspection report on the coding accuracy of prospective payment discharges billed as diagnosis-related group (DRG) 14.

In two previous studies, the Office of Inspector General (OIG) reabstracted the ICD-9-CM codes from samples of DRG 14 bills on a blinded basis and found upcoding that over-reimbursed hospitals \$31.5 million in 1984 and \$56.5 million in 1985. The attached report updates the previous studies by applying the same methodology to a nationally representative sample of 1988 discharges, the most recent year for which data were available.

These inspections find a significant improvement in DRG coding accuracy from 84.5 percent in 1984 and 84.2 percent in 1985 to 98.6 percent in 1988. The few coding errors no longer systematically over-reimburse the hospitals. This report, therefore, makes no recommendations.

We would appreciate receiving your comments on the draft report within 30 days of the date of this memorandum. The OIG briefed your staff about these inspections on October 31, 1991.

If you have any questions about this report, please call me or Michael Mangano, Deputy Inspector General for Evaluation and Inspections, or have your staff contact Penny Thompson at FTS 646-3138.

Attachment

Department of Health and Human Services

OFFICE OF
INSPECTOR GENERAL

DRAFT

**DRG 14 VALIDATION UPDATE:
SPECIFIC CEREBROVASCULAR
DISORDERS EXCEPT TRANSIENT
ISCHEMIC ATTACKS**

NOTICE - THIS DRAFT RESTRICTED TO OFFICIAL USE

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MARCH 1992

OEI-12-89-00192

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FINDINGS

DRG 14 coding error reduced: Of 145 discharges reabstracted for this inspection, 1.4 percent had coding errors. This proportion statistically significantly improved over the 15.5 percent for 1984 and the 15.8 percent for 1985. This proportion also statistically significantly improved over the 14.7 percent error rate previously reported for all 1988 DRGs. This inspection's low proportion of errors precluded identifying risks by hospital or patient demography.

Financial impact of DRG 14 coding error reduced: This inspection projected that DRG 14 under-reimbursed hospitals a nonsignificant \$9.3 million. This result contrasts with the statistically significant \$31.5 million over-reimbursement of the 1984 Inspection and \$56.6 million over-reimbursement of the 1985 Study.