

NATIONAL DRG VALIDATION STUDY
UNNECESSARY ADMISSIONS TO HOSPITALS



OFFICE OF INSPECTOR GENERAL
OFFICE OF ANALYSIS AND INSPECTIONS

AUGUST 1988

Office of Inspector General

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This Report

Entitled "National DRG Validation Study, Unnecessary Admissions to Hospitals," this study was conducted to analyze and profile the characteristics of cases of unnecessary admissions.

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EXECUTIVE SUMMARY

PURPOSE: This inspection examined unnecessary admissions to hospitals under the prospective payment system (PPS) from a number of perspectives, including: (1) the extent to which they occurred in a random sample of hospitals, (2) characteristics of hospitals with unnecessary admissions and (3) characteristics of cases which were unnecessary admissions. The report is one of a series in the National Diagnosis Related Group (DRG) Validation Study undertaken by the Office of Inspector General (OIG)

BACKGROUND: Effective October 1983, Congress mandated a change in Medicare payments to hospitals from a cost-based retrospective reimbursement system to a prospective payment system. Under PPS, hospitals currently receive a fixed payment based upon 1 of 475 DRGs for each Medicare patient discharge, regardless of the services provided or length of time a patient spends in the hospital. Hospitals retain a profit when patient care costs less than the DRG payment, but must absorb losses when costs are higher than the DRG. The PPS was intended to curb the rapidly escalating increases in Medicare costs for acute inpatient care by giving hospitals an incentive to reduce lengths of stay and eliminate unnecessary services while maintaining high quality care. Both the utilization and quality control peer review organizations (PROs) and the SuperPRO (the contractor which assists the Health Care Financing Administration [HCFA] in monitoring PROs) review patient hospital stays for unnecessary admissions. Criteria used by the PROs to screen for unnecessary admissions vary widely.

Because of a concern that PPS might give hospitals incentives to admit patients unnecessarily, this issue was included in the National DRG Validation Study. Given the risks associated with hospitalization, an unnecessary admission can endanger a patient's health (e.g., increased risk of nosocomial infections). In addition, reducing unnecessary admissions to hospitals is one of the most effective ways of saving Medicare costs.

Unnecessary admissions were identified by analyzing a random sample of 7,050 Medicare patients discharged from 239 hospitals between October 1984 and March 1985. These unnecessary admissions were analyzed in terms of several hospital variables, including bed size, urban/rural location, profit/nonprofit status and teaching status. Comparisons of hospitals by necessary and unnecessary admissions, as well as by frequencies of unnecessary admissions, were also made.

- Five DRGs are frequently associated with unnecessary admissions:
 - DRG 68 (upper respiratory tract infections, patients over age 69)
 - DRG 183 (digestive disorders, patients aged 18-69)
 - DRG 239 (bone cancer)
 - DRG 243 (medical back problems)
 - DRG 294 (diabetes, patients over age 35)

Although DRG 39 (cataract surgery) occurred frequently as an unnecessary admission, this procedure has shifted primarily to outpatient settings since our review.

RECOMMENDATIONS:

- The HCFA should ensure that Medicare does not pay for unnecessary hospital admissions by:
 - determining why the PROs identify a substantially lower rate of unnecessary admissions than either the SuperPRO or the OIG,
 - analyzing admission review practices of PROs with low disagreement rates to identify exemplary models and best practices which could be used to assist other PROs,
 - developing acceptable disagreement rates between PROs and the SuperPRO for unnecessary admissions and creating incentives for the PROs to reduce their disagreement rates,
 - incorporating reconciliation of high disagreement rates into PRO performance evaluations for consideration in renewal of PRO contracts,
 - mandating that PROs use standardized screens or criteria for admission reviews and
 - requiring that PROs improve their identification of unnecessary admissions in order to improve targeting of problem hospitals and physicians for intensified review. Approaches might include focusing on patients with short hospital stays, DRGs which are frequently unnecessary and types of hospitals with high rates of unnecessary admissions.
- The HCFA should ensure that hospitals meet Medicare's conditions of participation regarding accuracy and completeness of patient medical records.

INTRODUCTION

Effective October 1983, Congress mandated a change in Medicare payments to hospitals from a cost-based retrospective reimbursement system to a prospective payment system (PPS). Under PPS, hospitals currently receive a fixed payment based upon 1 of 475 diagnosis related groups (DRGs) for each Medicare patient discharge, regardless of the services provided or length of time a patient spends in the hospital. Hospitals retain a profit when patient care costs less than the DRG payment but must absorb losses when costs are higher than the DRG. PPS was intended to curb the rapidly escalating increases in Medicare costs for acute inpatient care by giving hospitals an incentive to reduce lengths of stay and eliminate unnecessary services while maintaining high quality care.

The Office of Inspector General (OIG) has undertaken a number of initiatives to evaluate the effects of PPS on hospital behavior and medical practices. To date, the OIG has completed validation studies of DRG 14 (strokes), DRG 82 (respiratory neoplasms) and DRG 88 (chronic obstructive pulmonary disease), as well as inspections on beneficiary notices under PPS and activity by the utilization and quality control peer review organizations (PROs) in identifying and handling inappropriate discharges and transfers. The OIG also has conducted pre-award audits of the PRO and SuperPRO contracts.

Current efforts underway include an audit on patient hospital stays of less than 24 hours (excluding deaths), an ongoing audit of Medicare profits in hospitals under PPS and a study of DRG 129 (cardiac arrest). An inspection of PRO performance has produced three draft reports on quality review activities, sanctions activities and PRO effectiveness.

Another major initiative is the National DRG Validation Study, which analyzes patterns of hospital behavior under PPS. The study is based on an analysis of extensive data compiled by the Health Data Institute (HDI) of Lexington, Massachusetts, under contract to the OIG. This report on unnecessary patient admissions to hospitals is one in a series generated from the National DRG Validation Study. Two reports in this series, focusing on premature discharges from hospitals and the accuracy of DRG coding, have been released. The OIG also has released a draft report on poor quality care under PPS. Additional reports will address short hospital stays and PRO performance in monitoring PPS activities.

Background

Because of a concern that PPS might give hospitals incentives to admit patients unnecessarily, this issue was included in

The HDI reviewers evaluated the patient's condition at three points: (1) upon admission, (2) during the stay and (3) at time of discharge. Registered nurses screened medical records for necessity of admission, using the Appropriateness Evaluation Protocol (AEP). If problems were found, the medical record was referred to a board-certified physician with extensive experience in peer review for a final determination. A narrative summary was prepared describing the nature of each unnecessary admission. Physicians ignored marginal problems or cases involving honest differences in medical judgment about appropriate case management. If documentation in the medical record was so poor that reviewers could not determine whether an admission was unnecessary, the patient was considered to be a necessary admission. An OIG physician evaluated all narrative summaries, confirming the conclusions of medical reviewers on all unnecessary admissions.

An admission was considered unnecessary if no reason for admission existed at the time a patient entered a hospital. OIG staff analyzed hospitals by bed size, urban/rural location, profit/nonprofit status and teaching status. Hospitals also were analyzed by the number of unnecessary admissions occurring in their patient samples: (a) none, (b) 1-2, (c) 3-5 and (d) 6 or more. Comparisons of necessary and unnecessary admissions were made. Calculations were based on weighted average scores and percentages (a summary of the data appears in appendices A through D). Fiscal projections were based on (a) the rate of unnecessary admissions by hospital size, (b) total PPS discharges in Fiscal Year (FY) 1985 and (c) estimated costs of providing care to these patients in alternative medical settings. Appendix E provides further information on the study methodology.

DISTRIBUTION OF HOSPITALS BY NUMBER OF UNNECESSARY ADMISSIONS (UAs) (N=239)

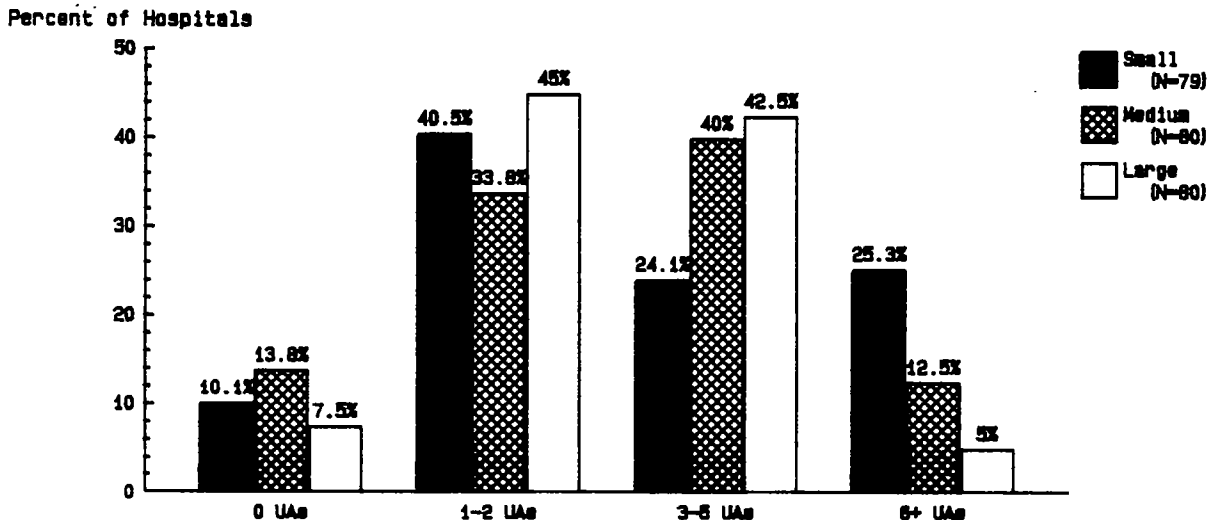
<u># UAs</u>	<u># Hospitals</u>	<u>Percent</u>
0	25	10.5
1 - 2	95	39.7
3 - 5	85	35.6
6 - 17	<u>34</u>	<u>14.2</u>
Total	239	100.0

Types of Hospitals

The OIG study analyzed hospital behavior under PPS in terms of four major variables: (1) size of hospital, (2) urban/rural location, (3) profit/ nonprofit status and (4) teaching status.

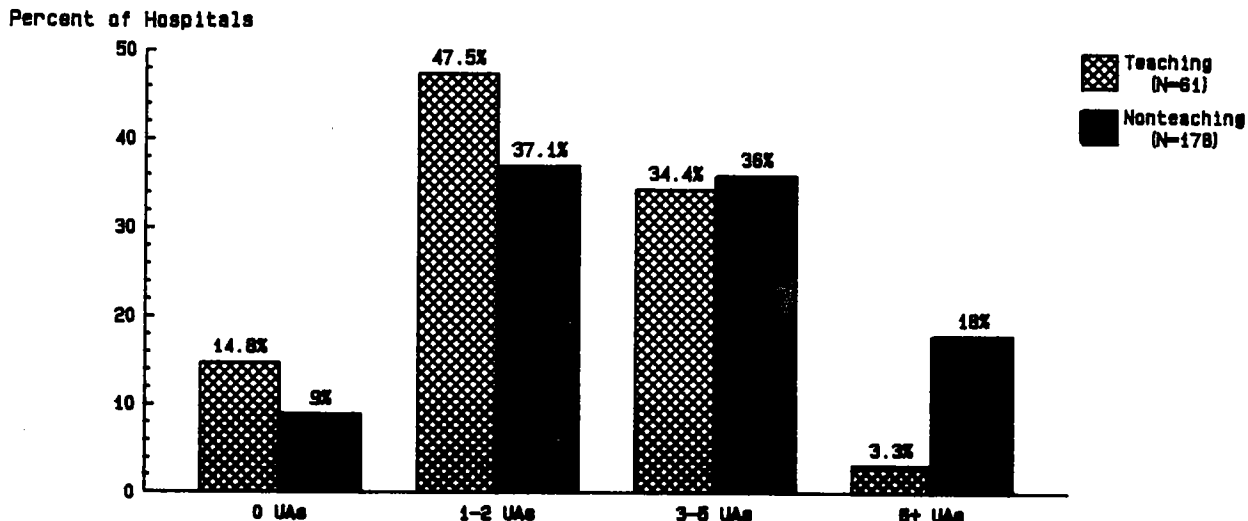
Bed Size. Overall, small hospitals had the greatest problems with unnecessary admissions (12.5 percent of patient admissions, compared with 10.1 percent in medium hospitals and 9.0 percent in large hospitals). This trend is most pronounced when comparing hospitals with the highest frequencies of unnecessary admissions (6 or more, which is at least 20 percent of sampled admissions). As the following table indicates, 25.3 percent of the small hospitals had 6 or more unnecessary admissions, compared with only 5.0 percent of the large hospitals. Because larger hospitals treat a much higher volume of patients, their lower rates still represent a substantial number of unnecessary admissions.

**COMPARISON by BED SIZE:
FREQUENCIES of UNNECESSARY ADMISSIONS (UAs)
N=239**



Teaching and Nonteaching Hospitals. Overall, nonteaching hospitals had a higher rate of unnecessary admissions (12.5 percent as compared with 8.8 percent in teaching hospitals). As the following table indicates, 18.0 percent of the nonteaching hospitals had 6 or more unnecessary admissions, compared with 3.3 percent of the teaching hospitals.

**COMPARISON by TEACHING/NONTEACHING STATUS:
FREQUENCIES of UNNECESSARY ADMISSIONS (UAs)
N=239**



Other Problems in Hospitals With High Rates of Unnecessary Admissions. The 34 hospitals with 6 or more unnecessary admissions also had twice as many premature discharges and patients with quality of care problems. Although these hospitals treated only 14.4 percent of the patients in the full sample (7,050 cases), they had 37.0 percent of the unnecessary admissions, 29.7 percent of the premature discharges and 28.2 percent of the poor quality of care cases. They also had major problems with improper documentation of medical records (further discussion of this issue appears on pages 9 and 10). In addition, patients unnecessarily admitted to these hospitals had longer average lengths of stay. Additional information on these hospitals can be found in appendix G.

MOST UNNECESSARY ADMISSIONS NEEDED OUTPATIENT CARE

There were 749 reasons identified for the 740 unnecessary admissions (9 patients had 2 reasons). Most of the unnecessary admissions needed medical attention, but not in an acute care setting. As the following table indicates, reasons for unnecessary admissions fell into five categories. The most significant factor by far, occurring in 77.8 percent of the cases, was that treatment should have been provided in an outpatient setting.

UNNECESSARY ADMISSIONS ARE HEALTHIER, LESS COMPLEX CASES

There are a number of indications that patients unnecessarily admitted to hospitals are healthier and have less complex problems than those who are appropriately admitted.

Discharge disposition. Eighty-nine percent of the unnecessary admissions went directly home from the hospital (compared with 70.5 percent of the necessary admissions). Keeping in mind that unnecessary admissions represented 10.5 percent of the full patient sample, unnecessary admissions accounted for 6.1 percent of the patients subsequently transferred to SNFs and 7.7 percent of the patients discharged with home health orders. They also accounted for 2.9 percent of the patients who died in the hospital.

Nosocomial infections. Unnecessary admissions had a lower rate of nosocomial infections (4.3 percent) than necessary admissions (5.8 percent).

Average length of stay (ALOS). The ALOS for unnecessary admissions was 4.4 days, compared with 7.6 days for necessary admissions. Although 64.6 percent of the unnecessary admissions stayed in the hospital less than 6 days, this was true of only 37.5 percent of the necessary admissions. ALOS for unnecessary admissions was remarkably consistent, regardless of type of hospital, a pattern which did not hold true for necessary admissions.

Case Mix Index (CMI). The CMI describes in a single measure the complexity of cases in a hospital by reflecting the weighted average of DRGs in that hospital. Hospitals treating a sicker patient population generally have a higher CMI. A comparison of necessary and unnecessary admissions within hospitals found that unnecessary admissions had a lower CMI, indicating the cases were less complex. As the following table indicates, the CMI is far more consistent for unnecessary admissions than necessary admissions, regardless of type of hospital. The difference between necessary and unnecessary admissions was most pronounced in large and teaching hospitals.

<u>PROPORTION OF CASES WITH IMPROPER DOCUMENTATION</u>				
<u>By Frequency of UAs in Hospitals (N=239)</u>				
<u># UAs in Hospitals</u>	<u># Hosp.</u>	<u>% Unneces. Admits</u>	<u>% Neces. Admits</u>	<u>% Average</u>
0	25	--	32.5	32.5
1-2	95	76.3	29.8	32.3
3-5	85	82.1	38.5	44.1
6+	34	86.4	41.6	53.6
Average		80.2	34.9	39.6

**TARGETING DIAGNOSIS RELATED GROUPS (DRGS) IDENTIFIED
UNNECESSARY ADMISSIONS**

At the time of our review, there were 468 possible DRGs; 352 (75.2 percent) occurred at least once in the study sample; unnecessary admissions occurred in half of these DRGs. The OIG staff analyzed DRGs which had (a) the highest numbers of unnecessary admissions (at least 10 cases) and (b) high rates (unnecessary admissions occurred at least 20 percent of the time). Analysis was based on DRGs assigned by the fiscal intermediary.

DRGs With the Highest Numbers of Unnecessary Admissions. The following table lists the 16 DRGs which had the highest absolute numbers of unnecessary admissions. The DRGs listed on this table show wide variation in the percentage of cases which were unnecessary admissions. For example, DRG 127 (heart failure and shock) was the sixth most common DRG to occur as an unnecessary admission, but it occurred far more frequently as a necessary admission (i.e., it was an unnecessary admission only 4.6 percent of the time). DRG 183 (digestive disorders, patients aged 18-69) was sixteenth on the list, but was an unnecessary admission 30.3 percent of the time.

All DRGs fall into 1 of 24 major diagnostic categories (MDCs). The MDCs are classifications of medical problems by organ system. There was at least 1 unnecessary admission in 23 of the MDCs, but three-fourths of the DRGs in the chart fell into 5 categories: (a) eye, (b) respiratory system, (c) digestive system, (d) circulatory system and (e) musculo-skeletal system and connective tissue. A breakout of all unnecessary admissions by MDC appears in appendix H. Except for DRG 39

DRGs With the Highest Rates of Unnecessary Admissions. The following table describes 17 DRGs which were unnecessary admissions at least 20 percent of the time. (The table excludes DRGs which occurred as unnecessary admissions less than five times in the full sample.) Although many of these DRGs had lower numbers of unnecessary admissions than the DRGs listed in the preceding table, they had the highest likelihood of being an unnecessary admission. For example, admission for DRG 240 (listed second in the table) was unnecessary 50 percent of the time, even though there were only 8 unnecessary admissions.

<u>DRGs WITH THE HIGHEST RATES OF UNNECESSARY ADMISSIONS (UAs)</u>					
DRG	DESCRIPTION	MDC	# UA	# TOTAL SAMPLE	% UA
39	CATARACT SURGERY	2	65	81	80.3
240	CONNECTIVE TISSUE DISORDERS, PATIENTS OVER AGE 69	8	8	16	50.0
348	ENLARGED PROSTATE, PATIENTS OVER AGE 69	12	5	10	50.0
425	ACUTE ADJUSTMENT REACTION	19	7	15	46.7
244	BONE INFECTION, PATIENTS OVER AGE 69	8	8	19	42.1
65	DIZZINESS	3	9	24	37.5
280	SKIN INJURY, PATIENTS OVER AGE 69	9	7	20	35.0
239	BONE CANCER	8	15	45	33.3
429	MENTAL RETARDATION	19	7	22	31.8
183	DIGESTIVE DISORDERS, PATIENTS AGE 18-69	6	10	33	30.3
243	MEDICAL BACK PROBLEMS	8	34	113	30.1
157	ANAL PROCEDURES, PATIENTS OVER AGE 69	6	7	25	28.0
325	URINARY TRACT DISORDERS, PATIENTS OVER AGE 69	11	6	22	27.3
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	1	5	20	25.0
68	UPPER RESPIRATORY TRACT INFECTIONS, PATIENTS OVER AGE 69	3	10	42	23.8
294	DIABETES, PATIENTS OVER AGE 35	10	27	121	22.3
82	RESPIRATORY NEOPLASMS	4	14	70	20.0

RECOMMENDATIONS

RECOMMENDATION #1--IMPROVED PRO IDENTIFICATION OF UNNECESSARY HOSPITAL ADMISSIONS

FINDING: The OIG found that 10.5 percent of the admissions sampled in the National DRG Validation Study were unnecessary. Both the OIG and SuperPRO have identified substantially higher rates of unnecessary admissions than the PROs. The PROs conduct admissions reviews using a variety of screening tools. The HCFA requires that PROs conduct an intensified review in hospitals when either 5 percent of their Medicare admissions or six Medicare cases--whichever is greater--are found to be unnecessary. Applying this standard to the OIG hospital sample, 71 percent of the hospitals would be subject to intensified PRO review. Hospital and case characteristics of unnecessary admissions include:

- Hospitals with the highest rates of unnecessary admissions (20 percent or more of their admissions) also had twice as many premature discharges and patients with quality of care problems.
- Small, rural, nonteaching and/or for-profit hospitals had higher rates of unnecessary admissions.
- Most of the unnecessary admissions needed medical attention, but care should have been in outpatient settings.
- Unnecessary admissions had shorter average lengths of stays.
- Five DRGs were associated frequently with unnecessary admissions.

RECOMMENDATION: The HCFA should ensure that Medicare does not pay for unnecessary admissions by:

- determining why the PROs identify a substantially lower rate of unnecessary admissions than either the SuperPRO or the OIG,
- analyzing admission review practices of PROs with low disagreement rates to identify exemplary models and best practices which could be used to assist other PROs,
- developing acceptable disagreement rates between PROs and the SuperPRO for unnecessary admissions and creating incentives for the PROs to reduce their disagreement rates.

COMPARISON OF HOSPITALS BY NUMBER OF UNNECESSARY ADMISSIONS (UAs): BEDSIZE EFFECT (N=239)																
(Analysis of all 7,050 Cases)																
Hospitals with UAs	<100 Beds (N=79)					100-299 Beds (N=80)					300+ Beds (N=80)					Over-ALL Average
	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	
N=	8	32	19	20		11	27	32	10		6	36	34	4		
CMI	.9621	1.0307	1.0025	.9411	.9943	1.1346	1.1057	1.1032	.9739	1.0922	1.3410	1.2230	1.1713	1.1935	1.2084	
Av. Pt. Age	75.79	76.39	76.49	74.41	75.85	74.23	73.84	73.24	74.92	73.79	72.28	71.88	72.46	70.70	73.90	
Av. Length Stay	5.40	5.99	5.99	6.00	5.93	7.52	7.59	7.52	6.68	7.44	10.87	8.31	8.08	8.13	7.26	
% Rural	87.50	75.00	94.74	70.00	79.75	18.18	33.33	28.12	40.00	30.00	16.67	2.78	8.82	0.00	6.25	
% Profit	0.00	0.00	15.79	20.00	8.86	0.00	18.52	25.00	10.00	17.50	0.00	0.00	5.88	0.00	2.50	
% Nonteaching	100.0	100.00	94.74	95.00	98.47	54.55	70.37	93.75	100.00	81.25	33.33	41.67	47.06	75.00	45.00	
% Cases Nosoc. Infec.	3.39	5.03	2.63	4.00	4.03	5.50	3.95	5.32	9.33	5.38	7.22	7.44	7.64	3.42	7.31	
% Cases Q.C. Problem	10.48	8.05	11.61	15.34	11.00	2.75	4.57	4.63	10.67	5.10	5.56	2.69	3.67	5.86	6.51	
% Cases Inapp. Doc.	39.16	31.07	40.34	55.58	40.32	29.23	33.85	44.78	49.00	39.47	29.45	32.42	45.52	54.83	38.88	
% Cases Recoded DRGs	27.00	22.88	25.77	23.87	24.26	17.70	19.63	17.26	19.67	18.42	19.44	16.53	16.04	18.49	16.64	
Wt. Change Recoded DRG	.0052	.1245	.0940	.1554	.1129	-.0424	.0636	.1128	.0325	.0648	-.02265	-.0034	.0974	.1033	.0433	

APPENDIX B

COMPARISON OF HOSPITALS BY NUMBER OF UNNECESSARY ADMISSIONS (UAs):											
RURAL/URBAN LOCATION (N=239)											
(Analysis of all 7,050 Cases)											
Hospitals with UAs	Rural (N=92)					Urban (N=147)					Over-All Average
	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	
N=	10	34	30	18		15	61	55	16		
CMI	1.0185	1.0353	1.0310	.9412	1.0137	1.2025	1.1748	1.1499	1.0246	1.1520	1.0987
Av. Pt. Age	75.89	76.71	75.60	74.67	75.86	73.17	72.43	72.59	73.50	72.68	73.90
Av. Lngth. Stay	6.20	6.01	6.59	5.88	6.19	8.61	8.06	7.85	7.09	7.93	7.26
% Nonteaching	100.00	100.00	100.00	100.00	100.00	40.00	52.46	61.82	87.50	58.50	74.48
% <100 Beds	70.00	70.59	60.00	77.78	68.48	6.67	13.11	1.82	37.50	10.88	33.05
% 100-299 Beds	20.00	26.47	30.00	22.22	26.09	60.00	29.51	41.82	37.50	38.10	33.47
% 300+ Beds	10.00	2.94	10.00	0.00	5.43	33.33	57.38	56.36	25.00	51.02	33.47
% Cases Nosoc. Infec.	3.71	4.42	3.86	6.11	4.49	6.25	6.31	6.62	4.82	6.26	5.58
% Cases Q.C. Problem	9.05	8.06	9.96	16.30	10.40	3.79	3.34	3.54	8.97	4.07	6.51
% Cases Inapp. Doc.	39.11	29.62	42.34	53.52	39.47	28.02	33.89	45.03	53.60	39.61	39.56
% Cases Recoded DRGs	22.92	22.23	21.26	22.04	21.94	19.60	17.98	16.60	21.97	18.06	19.53
Wt. Change Recoded DRG	.0203	.1133	.1024	.1138	.1026	-.0491	.0340	.1014	.1226	.0603	.0783

COMPARISON OF HOSPITALS BY NUMBER OF UNNECESSARY ADMISSIONS (UAs):											
RURAL/URBAN LOCATION (N=239)											
(Analysis of 6,310 Necessary Admissions Only)											
Hospitals with UAs	Rural (N=92)					Urban (N=147)					Over-All Average
	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	
N=	10	34	30	18		15	61	55	16		
CMI	1.0185	1.0478	1.0680	.9869	1.0393	1.2025	1.1924	1.1964	1.1019	1.1851	1.1289
Av. Pt. Age	75.89	76.82	75.73	74.38	75.89	73.17	72.44	72.62	74.08	72.76	73.97
Av. Lngth. Stay	6.20	6.07	7.00	6.24	6.42	8.61	8.28	8.28	7.89	8.27	7.56
% Nonteaching	100.00	100.00	100.00	100.00	100.00	40.00	52.46	61.82	87.50	58.50	74.48
% <100 Beds	70.00	70.59	60.00	77.78	68.48	6.67	13.11	1.82	37.50	10.88	33.05
% 100-299 Beds	20.00	26.47	30.00	22.22	26.09	60.00	29.51	41.82	37.50	38.10	33.47
% 300+ Beds	10.00	2.94	10.00	0.00	5.43	33.33	57.38	56.36	25.00	51.02	33.47
% Cases Nosoc. Infec.	3.71	4.58	4.05	6.77	4.74	6.25	6.37	6.86	4.93	6.38	5.75
% Cases Q.C. Problem	9.05	7.77	9.46	15.58	9.99	3.79	3.15	3.00	7.57	3.64	6.08
% Cases Inapp. Doc.	39.11	27.19	36.44	39.62	33.93	28.02	31.31	39.69	43.76	35.46	34.88
% Cases Recoded DRGs	22.92	22.14	20.07	21.55	21.45	19.60	18.04	16.03	21.16	17.76	19.14
Wt. Change Recoded DRG	.0203	.1129	.1162	.1173	.1066	-.0491	.0271	.1093	.1613	.0594	.0792

APPENDIX C

COMPARISON OF HOSPITALS BY NUMBER OF UNNECESSARY ADMISSIONS (UAs):											
PROFIT/NON-PROFIT STATUS (N=239)											
(Analysis of all 7,050 Cases)											
Hospitals with UAs	Non-Profit (N=216)					Profit (N=23)					Over-All Average
	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	
N=	25	90	72	29		0	5	13	5		
CMI	1.1289	1.1274	1.1092	.9783	1.1015	-	1.0792	1.1012	.9931	1.0729	1.0987
Av. Pt. Age	74.26	74.00	73.80	74.48	74.03	-	72.21	72.87	72.02	72.75	73.90
Av. Lngth. Stay	7.64	7.38	7.39	6.32	7.27	-	6.27	7.48	7.20	7.15	7.26
% Rural	40.00	37.78	37.50	55.17	40.28	-	0.0	23.08	40.00	21.74	38.49
% Nonteaching	64.00	67.78	72.22	93.10	72.22	-	100.00	92.31	100.00	95.65	74.48
% <100 Beds	32.00	35.56	22.22	55.17	33.33	-	0.00	23.08	80.00	30.43	33.05
% 100-299 Beds	44.00	24.44	33.33	31.03	30.55	-	100.00	61.54	20.00	60.87	33.47
% 300+ Beds	24.00	40.00	44.44	13.79	36.11	-	0.00	15.38	0.00	8.70	33.47
% Cases Nosoc. Infec.	5.24	5.76	5.51	5.65	5.60	-	3.33	6.42	4.67	5.37	5.58
% Cases Q.C. Problem	5.90	5.20	6.01	13.00	6.60	-	2.00	4.64	12.00	5.67	6.51
% Cases Inapp. Doc.	32.46	32.23	44.34	52.45	39.01	-	34.67	42.66	60.00	44.69	39.56
% Cases Recoded DRGs	20.80	19.50	18.37	20.85	19.45	-	19.33	17.48	28.67	20.31	19.53
Wt. Change Recoded DRG	-.0188	.0661	.0931	.0925	.0688	-	.0712	.1531	.2252	.1510	.0767

COMPARISON OF HOSPITALS BY NUMBER OF UNNECESSARY ADMISSIONS (UAs):												
PROFIT/NON-PROFIT STATUS (N=239)												
(Analysis of 6,310 Necessary Admissions Only)												
Hospitals with UAs	Non-Profit (N=216)					Profit (N=23)					Over-All Average	
	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average		
N=	25	90	72	29		0	5	13	5			
CMI	1.1289	1.1433	1.1511	1.0413	1.1305	-	1.0930	1.1507	1.0394	1.1140	1.1289	
Av. Pt. Age	74.26	74.03	73.83	74.51	74.05	-	73.67	73.14	72.67	73.15	73.97	
Av. Lngth. Stay	7.64	7.55	7.82	6.84	7.55	-	6.44	7.91	8.06	7.63	7.56	
% Rural	40.00	37.78	37.50	55.17	40.28	-	0.00	23.08	40.00	21.74	38.49	
% Nonteaching	64.00	67.78	72.22	93.10	72.22	-	100.00	92.31	100.00	95.65	74.48	
% <100 Beds	32.00	35.56	22.22	55.17	33.33	-	0.00	23.08	80.00	30.43	33.05	
% 100-299 Beds	44.00	24.44	33.33	31.03	30.55	-	100.00	61.54	20.00	60.87	33.47	
% 300+ Beds	24.00	40.00	44.44	13.79	36.11	-	0.00	15.38	0.00	8.70	33.47	
% Cases Nosoc. Infec.	5.24	5.85	5.58	5.82	5.69	-	3.50	7.45	6.43	6.37	5.75	
% Cases Q.C. Problem	5.90	4.99	5.31	11.84	6.12	-	1.40	5.09	11.67	5.72	6.08	
% Cases Inapp. Doc.	32.46	29.69	39.04	40.23	34.54	-	32.51	35.80	49.32	38.02	34.88	
% Cases Recoded DRGs	20.80	19.49	17.38	20.28	19.04	-	19.72	17.80	28.16	20.47	19.17	
Wt. Change Recoded DRG	-.0188	.0611	.1015	.1120	.0722	-	.0763	.1697	.2432	.1654	.0812	

APPENDIX D

COMPARISON OF HOSPITALS BY NUMBER OF UNNECESSARY ADMISSIONS (UAs): TEACHING/NON-TEACHING STATUS (N=239) (Analysis of All 7,050 Cases)											
Hospitals with UAs	Non-Teaching (N=178)					Teaching (N=61)					Over-All Average
	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	
N=	16	66	64	32		9	29	21	2		
CMI	1.0485	1.0931	1.0737	.9747	1.0608	1.2719	1.1973	1.2124	1.0720	1.2094	1.0987
Av. Pt. Age	75.14	75.20	74.09	74.46	74.66	72.69	71.14	72.33	68.75	71.70	73.90
Av. Lngth. Stay	6.75	6.79	7.18	6.36	6.85	9.24	8.52	8.10	7.88	8.46	7.26
% Rural	62.50	51.52	46.88	56.25	51.69	0.00	0.00	0.00	0.00	0.00	38.49
% Profit	0.00	7.58	18.75	15.62	12.36	0.00	0.00	4.76	0.00	1.64	9.62
% <100 Beds	50.00	48.48	28.12	59.38	43.26	0.00	0.00	4.76	50.00	3.28	33.05
% 100-299 Beds	37.50	28.79	46.88	31.25	36.51	55.56	27.59	9.52	0.00	24.59	33.47
% 300+ Beds	12.50	22.73	25.00	9.38	20.22	44.44	72.41	85.71	50.00	72.13	33.47
% Cases Nosoc. Infec.	3.78	4.46	4.99	5.53	4.78	7.83	8.30	7.65	5.00	7.90	5.58
% Cases Q.C. Problem	7.95	5.62	6.98	13.34	7.71	2.25	3.68	2.23	5.00	3.01	6.51
% Cases Inapp. Doc.	38.82	32.26	44.82	54.30	41.33	21.15	32.60	41.84	41.66	34.39	39.56
% Cases Recoded DRGs	23.33	19.81	18.78	22.44	20.22	16.73	18.78	16.56	15.00	17.58	19.54
Wt. Change Recoded DRG	.0118	.1021	.0839	.1185	.0900	-.0942	-.0195	.1640	.1032	.0367	.0824

COMPARISON OF HOSPITALS BY NUMBER OF UNNECESSARY ADMISSIONS (UAs)											
TEACHING/NON-TEACHING STATUS (N=239)											
(Analysis of 6,310 Necessary Admissions Only)											
Hospitals with UAs	Non-Teaching (N=178)					Teaching (N=61)					Over-All Average
	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	0 UAs	1 - 2 UAs	3 - 5 UAs	6 - 17 UAs	Average	
N=	16	66	64	32		9	29	21	2		
CMI	1.0485	1.1072	1.1120	1.0371	1.0911	1.2719	1.2167	1.2699	1.1031	1.2394	1.1289
Av. Pt. Age	75.14	75.29	74.16	74.44	74.72	72.69	71.09	72.39	70.99	71.77	73.97
Av.Length.Stay	6.75	6.93	7.57	6.95	7.14	9.24	8.76	8.64	8.20	8.76	7.56
% Rural	62.50	51.52	46.88	56.25	51.69	0.00	0.00	0.00	0.00	0.00	38.49
% Profit	0.00	7.58	18.75	15.62	12.36	0.00	0.00	4.76	0.00	1.64	9.62
% <100 Beds	50.00	48.48	28.12	59.38	43.26	0.00	0.00	4.76	50.00	3.28	33.05
% 100-299 Beds	37.50	28.79	46.88	31.25	36.51	55.56	27.59	9.52	0.00	24.59	33.47
% 300+ Beds	12.50	22.73	25.00	9.38	20.22	44.44	72.41	85.71	50.00	72.13	33.47
% Cases Nosoc. Infec.	3.78	4.55	5.21	5.89	4.96	7.83	8.41	7.89	6.25	8.08	5.75
% Cases Q.C. Problem	7.95	5.28	6.36	12.15	7.14	2.25	3.73	1.98	6.34	2.99	6.08
% Cases Inapp. Doc.	38.82	30.03	39.15	42.19	36.29	21.15	29.39	36.70	31.52	30.76	34.88
% Cases Recoded DRGs	23.33	19.95	17.65	21.52	19.71	16.73	18.51	16.82	19.15	17.68	19.19
Wt. Change Recoded DRG	.0118	.1020	.0923	.1396	.0972	-.0942	-.0364	.1758	.1032	.0320	.0806

SAMPLING AND METHODOLOGY

The National DRG Validation Study used a stratified two-stage sampling design based on hospitals. The sample divided the population of hospitals meeting the study's eligibility criteria (outlined below) into three groups based on bed size: less than 100 beds, 100 to 299 beds, 300 or more beds.

The first stage used simple random sampling without replacement to select 80 hospitals within each group for a total sample size of 240 hospitals. First, it included only acute care, short-stay facilities. This test also excluded specialty institutions such as children's hospitals. Second, as of October 1, 1983, a waiver provision exempted New York, New Jersey, Massachusetts and Maryland from PPS. Therefore, the sample excluded facilities in these States. Third, each facility had to have contributed data to the construction of the initial relative weights assigned to DRG categories at the start of PPS. These initial relative weights derived from a 20 percent sample of Medicare discharges from facilities participating in the program in 1981. To be included in the sampling frame, a facility had to both (a) contribute discharges to the construction of the initial relative weights and (b) participate as a provider at the beginning of PPS, October 1, 1983.

The effective universe of hospitals available for study numbered 4,913. Of the initial sample of 240 hospitals, 1 facility terminated its Medicare eligibility between the sampling time frame and the actual collection of medical records. The first-stage sample therefore included 239 (4.9 percent) randomly selected, short term, acute care facilities eligible under the Medicare program since at least 1981 and not located in a waiver State.

The second stage of the design employed systematic random sampling to select 30 Medicare discharges from each of the 239 hospitals. The HCFA's Bureau of Data Management and Strategy supplied a list of all final bills they received from the fiscal intermediaries through April 30, 1985. Each bill represented one Part A Medicare discharge for the time period October 1, 1984 to March 31, 1985. If a facility had fewer than 30 discharges during the applicable period, all available Medicare discharges were selected.

A hospital was considered to be:

- urban if it was located within a standard metropolitan area as defined by the Bureau of Census,
- teaching if it had an accredited residency program,
- for-profit if so listed by the American Hospital Association,
- small if the HCFA-certified bed size was less than 100 beds,
- medium if the HCFA-certified bed size was between 100 and 299 beds inclusive,
- large if the HCFA-certified bed size was more than 299 beds.

These classes of hospitals became a central basis for analysis of the selected variables. To the basic classifications of urban/rural, teaching/nonteaching, profit/nonprofit and small/medium/large, we added a further division--the frequency of unnecessary admissions in hospitals. This permitted comparisons, for example, between small hospitals with no unnecessary admissions and small hospitals with six or more unnecessary admissions.

Further analysis was conducted to determine whether hospitals treated necessary admissions differently than unnecessary admissions. Comparisons were made once again by using the weighted averages of pertinent variables for necessary and unnecessary admissions.

Fiscal Projections

- First, projections were made using the actual dollars paid for the 7,050 Medicare patients in the sample (derived from HCFA PATBILL files). We multiplied the number of patient discharges in each bed size category by the average cost per discharge in bed size categories for a total in rounded figures. Calculations show the total dollars paid to sampled hospitals in the three bed size categories. Small hospitals, for example, were paid \$4.98 million for 2,276 discharges at an average cost of \$2,186.

<u>PPS admissions (FY 1985)</u>	<u>Small</u>	<u>Medium</u>	<u>Large</u>
# discharges (in millions)	1.52	3.11	3.65
Multiplied by average cost/ discharge	x <u>\$2,186</u>	x <u>\$3,222</u>	x <u>\$3,999</u>
Yields dollars paid (in millions)	\$3,323	\$10,020	\$14,596
Times percentage of sample dollars for unnecessary admissions	x <u>10.4</u>	x <u>7.5</u>	x <u>6.1</u>
Yields dollars for unnecessary admissions (in millions)	\$345.6	\$751.5	\$890.4
Total dollars (in millions) spent on unnecessary admissions:			\$1,987.5

- Finally, we estimated Medicare dollars which would have been spent for the care of unnecessary admissions in other medical settings. Analyzing a subsample of the 740 unnecessary admissions, we compared actual acute care costs with an estimate of costs for specific medical treatment in an alternative setting. Projections were made to the universe for patients requiring medical attention.

	<u>Small</u>	<u>Medium</u>	<u>Large</u>	<u>Total</u>
Hospital costs for unnecessary admissions (in millions)	\$345.6	\$751.5	\$890.4	\$1,987.5
Costs for patient care in other medical settings (in millions)	<u>155.3</u>	<u>353.9</u>	<u>429.7</u>	<u>939.0</u>
Difference between acute and non-acute medical settings (in millions)	\$190.3	\$397.6	\$460.7	\$1,048.5

APPENDIX F

DISTRIBUTION OF HOSPITALS BY NUMBER OF
UNNECESSARY ADMISSIONS (UAs) (N=239)

<u># UAs</u>	<u># Hospitals</u>	<u>Percent</u>
0	25	10.5
1	45	18.8
2	50	20.9
3	40	16.7
4	24	10.0
5	21	8.8
6	15	6.3
7	5	2.1
8	4	1.7
9	2	.8
10	2	.8
11	1	.4
12	3	1.3
15	1	.4
17	1	.4

APPENDIX G

CHARACTERISTICS OF HOSPITALS WITH 6+ UNNECESSARY ADMISSIONS (N=34)											
STATE	FEDERAL REGION	# ADMITS	# UAs	% UAs	# QUALITY OF CARE CASES	# PREMATURE DISCHARGES	BED SIZE	RURAL/ URBAN	TEACHING/ NONTAACHING	PROFIT/ NONPROFIT	
CA	9	30	17	56.7	1	1	S	U	NT	P	
IL	5	30	15	50.0	7	1	S	R	NT	NP	
IL	5	30	12	40.0	3	0	M	U	NT	NP	
TX	6	30	12	40.0	9	3	S	R	NT	NP	
WV	3	30	12	40.0	3	1	M	U	NT	NP	
ID	10	30	11	36.7	7	1	S	R	NT	NP	
LA	6	30	10	34.5	6	2	S	R	NT	NP	
TN	4	29	10	33.3	1	0	L	U	NT	NP	
LA	4	30	9	30.0	5	1	M	R	NT	P	
TX	4	30	9	30.0	6	1	S	U	NT	P	
IN	5	30	8	26.7	3	0	S	U	NT	NP	
IN	5	30	8	26.7	2	1	S	R	NT	NP	
KS	7	30	8	26.7	4	1	S	R	NT	NP	
OH	5	30	8	26.7	3	0	L	U	NT	NP	
AL	4	30	7	23.3	2	0	M	U	NT	NP	
GA	4	30	7	23.3	1	0	L	U	T	NP	
GA	4	30	7	23.3	6	0	M	R	NT	NP	
MS	4	30	7	23.3	2	0	L	U	NT	NP	
TX	6	30	7	23.3	11	4	S	R	NT	NP	
TX	6	29	6	21.0	1	0	S	U	NT	NP	
AL	4	30	6	20.0	7	0	S	R	NT	NP	
LA	6	30	6	20.0	1	0	M	R	NT	NP	
MI	5	30	6	20.0	2	0	M	U	NT	NP	
MI	5	30	6	20.0	2	0	S	U	T	NP	
MS	4	30	6	20.0	3	1	S	R	NT	NP	
MO	7	30	6	20.0	1	1	M	U	NT	NP	
MO	7	30	6	20.0	1	0	M	R	NT	NP	
MO	7	30	6	20.0	4	1	S	R	NT	NP	
SC	4	30	6	20.0	2	0	S	R	NT	NP	
SD	8	30	6	20.0	3	1	S	R	NT	NP	
TN	4	30	6	20.0	2	0	S	R	NT	NP	
TX	6	30	6	20.0	8	1	M	U	NT	NP	
TX	6	30	6	20.0	4	0	S	U	NT	P	
WI	5	30	6	20.0	8	0	S	R	NT	NP	
TOTAL ¹ (%)		1018	274 (37.0)		131 (28.2)	22 (29.7)					

¹ PERCENTAGES ARE BASED ON THE FACT THAT THERE WERE 740 UNNECESSARY ADMISSIONS, 464 CASES WITH QUALITY OF CARE PROBLEMS AND 74 PREMATURE DISCHARGES IN THE SAMPLE OF 7,050 PATIENTS.

APPENDIX H

UNNECESSARY ADMISSIONS BY MAJOR DIAGNOSTIC CATEGORY (MDC) (N=740)				
MDC	DESCRIPTION	# of UAs	# All Admits	% of UAs
8	Diseases and Disorders of the Musculoskeletal System and Connective Tissue	106	627	16.9
6	Diseases and Disorders of the Digestive System	106	883	12.0
4	Diseases and Disorders of the Respiratory System	79	1052	7.5
2	Diseases and Disorders of the Eye	73	104	70.2
5	Diseases and Disorders of the Circulatory System	52	1643	3.2
1	Diseases and Disorders of the Nervous System	44	565	7.8
10	Endocrine, Nutritional and Metabolic Diseases and Disorders	39	348	11.2
3	Diseases and Disorders of the Ear Nose and Throat	37	155	23.9
11	Diseases and Disorders of the Kidney and Urinary Tract	35	332	10.5
23	Factors Influencing Health Status and Other Contact with Health Services	27	69	39.1
9	Diseases and Disorders of the Skin Subcutaneous Tissue and Breast	25	181	13.8
19	Mental Diseases and Disorders	24	112	21.4
7	Hepatobiliary System and Pancreas	18	194	9.3
17	Myeloproliferative Diseases and Disorders and Poorly Differentiated Neoplasms	15	120	12.5
12	Diseases and Disorders of the Male Reproductive System	13	194	6.7
13	Diseases and Disorders of the Female Reproductive System	10	82	12.2
16	Blood, Blood Forming Organs and Immunological Diseases and Disorders	10	88	11.4
18	Infectious and Parasitic Diseases	9	108	8.3
20	Substance Abuse and Substance Induced Organic Mental Disorders	8	41	19.5
24	DRG 468	5	65	7.7
21	Injury, Poisoning and Toxic Effects of Drugs	4	81	4.9
22	Burns	1	5	20.0
14	Pregnancy, Childbirth and the Puerperium	0	1	0.0