



A BRIEF ORIGINAL CONTRIBUTION

Concordance of Medicare Data and Population-based Clinical Data on Cataract Surgery Utilization in Olmsted County, Minnesota

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The authors assessed concordance of local Medicare health care utilization data on cataract surgery and estimates generated using the databases of the Rochester Epidemiology Project, which capture virtually all medical care received by residents of Olmsted County, Minnesota. The Rochester Project databases identified 1,353 primary cataract extractions performed in Olmsted County between October 1989 and December 1993 among county residents aged ≥ 65 years. Medicare data identified 1,148 claims—84.8% of the number of procedures identified by the Rochester Project. Ratios of numbers of encounters (Medicare/Rochester Project) were 189/350 (0.540) for 1992 versus 959/1,003 (0.956) for the other years combined. Changes in Medicare data file transfer procedures may have produced the 1992 data shortfall. Medicare data should periodically be compared with source data to assess concordance. *Am J Epidemiol* 1997;145:1123–6.

cataract extraction; epidemiologic methods; health services research; medical record linkage; medical records; Medicare Part A; Medicare Part B

Because the Medicare program of the Health Care Financing Administration (HCFA) subsidizes medical care for almost all Americans aged ≥ 65 years, its computerized claims may be used to estimate specific health care utilization in this age group (1). For example, samples of national Medicare data have been used to estimate that Medicare beneficiaries underwent approximately 1.3 million cataract extractions in 1991 (2, 3). Partly as an internal evaluation of the completeness of data capture, an analysis of cataract surgery utilization among residents of Olmsted County, Minnesota (4, 5) included a separate assessment of concordance between information from the study's clinical databases and local Medicare figures for the same population.

Received for publication July 19, 1996, and in final form January 17, 1997.

Abbreviations: CPT-4, *Physicians' Current Procedural Terminology*, Fourth Edition; HCFA, Health Care Financing Administration; ICD-9-CM, *International Classification of Diseases, Ninth Revision, Clinical Modification*.

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MATERIALS AND METHODS

We analyzed rates of cataract surgery performed between 1980 and 1994 in residents of Olmsted County, Minnesota, using indexing databases from the Mayo Clinic and the Rochester Epidemiology Project (6, 7). By linking records from the Mayo Clinic, the Olmsted Medical Group, and their affiliated hospitals and other providers, these databases identify virtually all medical care provided to residents of the city of Rochester and the rest of Olmsted County. The total population of the county was 106,470 in 1990 (8).

We used Mayo Clinic modifications of *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) (9) procedure codes 1311, 1319, 1320, 1330, 1341, 1342, 1343, 1359, 1369, and 1371 and *Physicians' Current Procedural Terminology*, Fourth Edition (CPT-4) (10) codes 66840, 66850, 66920, 66930, 66940, 66983, and 66984 to identify primary cataract extraction procedures. Focusing on the coding of surgical procedures rather than on patients allowed us to count sequential bilateral cataract extractions separately. Patient residence within Olmsted County at the time of surgery was verified using previously validated procedures. Two ophthalmologists (K. B., L. B.) excluded secondary cataract procedures by reviewing records of all cataract extractions not coded as phacoemulsification, intracapsular extraction, or extracapsular extraction. A

12.5 percent stratified random sample of all records (with oversampling for the years surrounding a 1988 coding change) was also reviewed to assess the accuracy of the coded demographic and procedure data.

For Medicare Part A and Part B claims filed since October 1989 for inpatient or outpatient surgery performed on Medicare beneficiaries who are Minnesota residents, the state's peer review organization, the Foundation for Health Care Evaluation (Bloomington, Minnesota), compiles data on diagnosis, patient birth date and address, provider address, and the date and type of procedure performed. Using Foundation data, we identified Medicare claims for procedures with the above-mentioned ICD-9-CM and CPT-4 procedure codes which were performed on beneficiaries who were ≥ 65 years of age, had valid Olmsted County beneficiary and provider zip codes, and had undergone primary cataract extraction between October 1989 and December 1993.

These Medicare data were compared with Rochester Project figures for encounters in patients meeting the same demographic and clinical criteria. Since Medicare data would not identify patients treated at the Minneapolis Department of Veterans Affairs Hospital (90 miles (144 km) away in Hennepin County), our comparison was confined to Olmsted County residents treated within Olmsted County. Medicare rules prohibiting release of patient names or addresses precluded our determining whether or not individual patients were present in both data sets, and did not allow identification of simultaneous or sequential billing for bilateral procedures performed in individual Medicare beneficiaries. Consequently, we examined concordance between Rochester Project and Medicare data by comparing numbers of encounters stratified by patient age and calendar time.

RESULTS

Overall, the Rochester Epidemiology Project data identified 4,294 primary cataract extractions performed from 1980 through 1994 on documented Olmsted County residents. Review of a sample of 540 charts identified only five (0.9 percent) which should have been excluded because of incorrect procedure coding. We did not adjust utilization estimates because of this misclassification. The study cohort included 1,470 cataract surgery procedures performed in Olmsted County between October 1989 and December 1993 on probable residents of Olmsted County. Exclusion of 117 procedures performed in non-county residents left 1,353 procedures.

Among 78,623 Medicare claims filed for cataract surgery performed in Minnesota residents between October 1989 and June 1994, 77,548 (98.6 percent) had valid age and zip code information. There were 1,156 claims for surgery performed between October 1989 and December 1993 in Olmsted County residents aged ≥ 65 years. Exclusion of the eight procedures performed outside of Olmsted County left 1,148 cases.

Thus, the number of procedures of interest identified through Medicare versus Rochester Project data (i.e., the Medicare/Rochester Project ratio) was $1,148/1,353 = 0.848$. Investigation of this relatively low figure indicated that ratios were relatively stable across age strata (table 1). However, while the ratio for 1989–1991 and 1993 combined was 0.956, it was only 0.540 for 1992 as a whole. When data were stratified by month for the years 1991–1993 (figure 1), the ratio was found to have declined from 1.000 in December 1991 to 0.200 in September 1992. It climbed back up to 0.960 in December 1992. With some monthly fluctuation, the ratio for 1993 averaged 0.946.

TABLE 1. Concordance of Medicare and Rochester Epidemiology Project counts of cataract surgery procedures performed in Olmsted County, Minnesota, among county residents aged ≥ 65 years, by year and age group, 1989–1993

Age group (years)	Numbers of Medicare/Rochester Epidemiology Project encounters identified per year						M/REP* ratio
	1989†	1990	1991	1992	1993	Total	
65–69	10/14	42/49	34/41	20/44	39/41	145/189	0.767
70–74	5/6	57/57	63/67	45/74	60/65	230/269	0.855
75–79	17/17	55/59	78/81	34/75	92/95	276/327	0.844
80–84	13/9	60/58	71/75	46/86	60/69	250/297	0.842
85–89	7/7	46/44	46/46	28/47	48/48	175/192	0.911
90–94	2/2	18/18	13/13	16/22	12/10	61/65	0.938
95–99	0/0	1/1	5/5	0/2	3/4	9/12	0.750
100–104	0/0	0/0	2/2	0/0	0/0	2/2	1.000
Total	54/55	279/286	312/330	189/350	314/332	1,148/1,353	0.848
M/REP ratio	0.982	0.976	0.945	0.540	0.941	0.848	

* M/REP, Medicare/Rochester Epidemiology Project.

† October–December 1989.

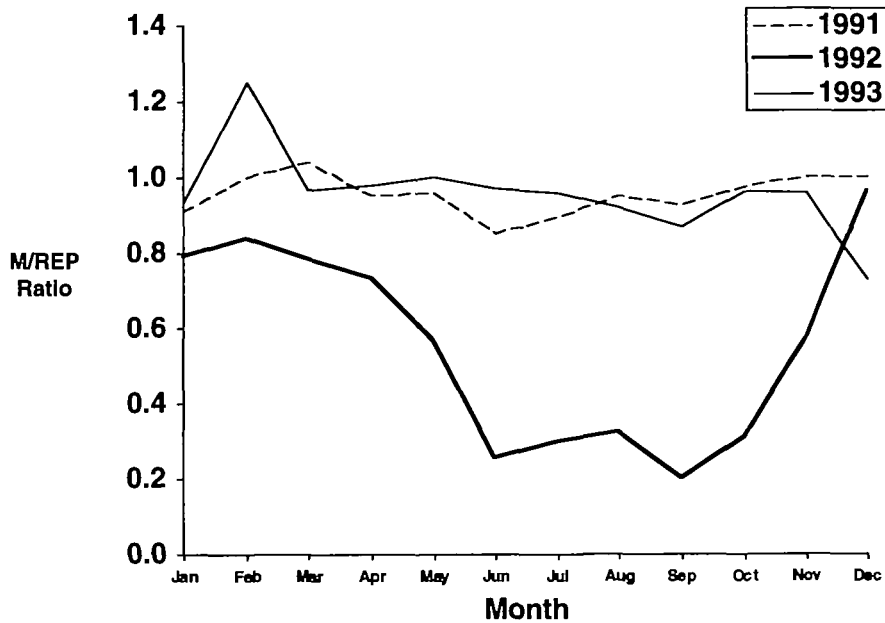


FIGURE 1. Ratio of numbers of cataract surgery procedures identified using data from Medicare (M) and the Rochester Epidemiology Project (REP) among county residents aged ≥ 65 years, Olmsted County, Minnesota, 1991–1993.

DISCUSSION

Various methodological issues associated with the use of Medicare data for epidemiologic and health services research have been discussed elsewhere (1–3, 11, 12). While the internal concordance of various Medicare data components has been addressed (13), Rochester Project data allowed Medicare claims data to be compared with external population-based data on the same population. We obtained Medicare data from the local peer review organization rather than from HCFA's Medicare Provider Analysis and Review Part A file, because Part A data would incompletely capture outpatient cataract surgery. The 5 percent random sample data also available from HCFA include Part A and Part B claims and should, therefore, capture outpatient surgery. However, since this data set is a random sample which does not include all cases, it could not be used to assess concordance with Rochester Project data designed to capture all cases.

Medicare/Rochester Project ratios were reasonably stable across age strata (table 1). Relatively low figures for persons aged 95–99 years and 65–69 years may reflect small numbers of patients and late Medicare registration among newly eligible patients, respectively. However, month-by-month review of procedure volumes did identify a transient but large decline in 1992 Medicare claims. Discussions with Foundation for Health Care Evaluation staff (Gerri Baumgartner, Foundation for Health Care Evaluation, personal communication, 1996) indicated that, historically, state peer review organizations had received

encounter claims data directly from fiscal intermediaries. However, as of July 1992, HCFA began routing this information from the fiscal intermediaries directly to HCFA, and from there to the state peer review organizations. The Foundation appears to have received incomplete claims data for several months early in the implementation of this procedure. The interval between Medicare encounters and the routine processing of their claims would explain the timing of the observed data shortfall. Regardless of the reason, our study identified a time frame in which local Medicare data may have systematically underestimated the numbers of cataract extractions performed. Such undercounting appears to better explain the 1992 decline in Medicare claims than would a bona fide transient reduction in the numbers of patients treated, since numbers based on Rochester Project data were reasonably stable over the entire study time frame.

Estimates of the frequency of cataract surgery in Olmsted County based on Medicare and Rochester Project data from before and after 1992 were concordant within 5 percent. Our record review indicates that only 0.9 percent of the included patients should have been excluded from the Rochester Project data. Therefore, the documented absence of significant miscoding makes the 5 percent discrepancy seen during periods of stable Medicare data transfer procedures unlikely to reflect overascertainment in the Rochester Project data. The number of patients incorrectly excluded from the Rochester Project data could not be determined.

Our review of Medicare and Rochester Project data suggests that these two sources provide reasonably accurate estimates of the frequencies of procedures performed in nonfederal facilities among patients aged ≥ 65 years. The minor discrepancy between Medicare and Rochester figures for years other than 1992 appears to represent slight underascertainment by the Medicare system. This may reflect coding errors or coverage not provided to all county residents aged ≥ 65 years. In patients with known bilateral cataracts, primary extraction procedures performed in the two eyes would be separated by several weeks. Rochester Project data would count such sequential bilateral procedures separately. Since a provider would be unlikely to file a single Medicare claim for primary cataract extractions performed sequentially on both of a patient's eyes within a short time frame, this is not a probable explanation for the minor overall data shortfall. Low managed care penetrance in Olmsted County decreased the degree to which variations in Medicare capture of care provided to participants in capitated health care plans could have been responsible for the minor data shortfall seen in our study population. However, this may be a major factor in locations with a larger managed care presence.

Our study identified significant discrepancies between local Medicare data and clinical database information related to a single procedure performed during a limited time frame in a circumscribed population. The postulated explanation for the shortfall detected in our study would presumably not affect estimates of cataract surgery incidence in the United States extrapolated from the nationwide 5 percent sample. However, it might be useful to compare national data from 1992 with figures from 1991 and 1993 to exclude the possibility of major discrepancies.

The degree to which similar problems would be encountered using local Medicare data generated in other settings or for other procedures is unknown. Nonetheless, to whatever degree other researchers use Medicare claims data from their local peer review organizations to estimate health care utilization by Medicare populations, they should be aware of the potential limitations of data from 1992. Estimates based on local Medicare data could be externally validated by comparing clinical and administrative information reflecting the same patient population experience. For example, investigators could periodically compare numbers of procedure-specific Medicare claims filed by a given institution with data on the same encounters as provided by the local entity administering Medicare claims. This would facilitate

identification of potential discrepancies, while encouraging appropriate use of the significant data resource represented by Medicare claims information.

ACKNOWLEDGMENTS

This study was supported by an unrestricted grant to the Mayo Clinic from the Research to Prevent Blindness Foundation, Inc., and by grant AR 30582 from the National Institutes of Health. Essential Medicare data were provided by Gerri Baumgartner of the Foundation for Health Care Evaluation. Assistance with programming and data analysis was provided by Christine Boos of the Mayo Clinic. Assistance with manuscript preparation was provided by Marilyn Goodman and Karen Tennison of the Mayo Clinic.

This paper was presented in part at the 29th Annual Meeting of the Society for Epidemiologic Research, Boston, Massachusetts, June 13–15, 1996.

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