Published in final edited form as:

JAMA Ophthalmol. 2013 January ; 131(1): 119–120. doi:10.1001/jamaophthalmol.2013.577.

Accuracy of International Classification of Disease (ICD-9-CM) Billing Codes for Common Ophthalmologic Conditions

Kelly W. Muir, MD, MS¹, Chirag Gupta, MD², Prakriti Gill, BS³, and Joshua D. Stein, MD, MS⁴

¹Department of Ophthalmology and Visual Sciences, Duke University, Durham NC

²Department of Ophthalmology and Visual Sciences, William Beaumont Hospital, Royal Oak, MI

³Mercer University School of Medicine, Macon, GA

⁴Department of Ophthalmology and Visual Sciences, W.K. Kellogg Eye Center, University of Michigan, Ann Arbor, MI

To the Editor

An increasing number of analyses use administrative claims data to study the epidemiology, risk factors, and resource consumption associated with patients with ocular diseases. These sources of voluminous data allow researchers to study common and uncommon conditions and assess care delivered by different providers in various communities. Since claims data are collected primarily for billing, not research purposes, a concern is whether the diagnoses listed in the billing records reflect the actual conditions described in the medical record.¹ If claims data were found to inaccurately reflect patients' conditions, the usefulness of these data for research would be limited. The accuracy of claims data has been examined for selected eye diseases but not for many common ophthalmic conditions.^{2–4} We examine the accuracy of claims data for five such conditions.

Methods

With Institutional Review Board approval, 982 consecutive billing records of patients coded with the following ocular conditions were identified from two academic medical centers: cataract (International Classification of Disease-9 [ICD-9-CM] codes 366-366.4), glaucoma suspect (365.0), primary open angle glaucoma (OAG) (365.11), proliferative diabetic retinopathy (PDR) (362.02), and nonexudative macular degeneration (NEAMD) (362.51). One abstractor (KWM) reviewed the documentation in the medical record for each billed encounter and scored the billing code as correct or incorrect. An encounter was classified as billed correctly if evidence in the medical record substantiated that the patient had the condition indicated on the billing form. If no such confirmatory evidence was found, the encounter was classified as billed incorrectly.

Results

Of the 982 encounters reviewed, 949 (97%) were coded correctly. The proportion of encounters with correct codes ranged from 92% (NEAMD) to 100% (cataract) (Table 1).

Corresponding Author: Joshua D. Stein, MD, MS, University of Michigan, W. K. Kellogg Eye Center, 1000 Wall Street, Ann Arbor, MI 48105, jdstein@med.umich.edu, Phone: 734-763-7246, Fax: 734-232-8181.

No conflicting relationship exists for any author regarding any material discussed in this manuscript.

Presented at the Association for Research in Vision and Ophthalmology meeting, Ft. Lauderdale, FL, May 7, 2012

The most common reason for incorrect coding was insufficient detail. For example, in 4 of 10 encounters billed as PDR, the impression noted postoperative status but no diagnosis related to the retinal photocoagulation procedure performed. The proportion of encounters billed correctly was similar between the sites (414/430 [96%] vs. 535/552 [97%], $p=0.60$). In a multivariable logistic regression model including site, provider type, provider subspecialty, patient age, race, and ocular condition, only ocular condition was associated with incongruity between the billed ICD-9-CM code and chart documentation ($p<0.0001$).

Comment

For 97% of encounters, the medical record documentation supported the ICD-9-CM billing codes used. For all five conditions studied, greater than 92% of encounters were billed accurately. Our findings expand upon the findings of the previous studies of cataract surgery³ and glaucoma.⁴

This study included records from 67 providers (ophthalmologists, optometrists, generalists, subspecialists) at two institutions. However, the sites, both academic medical centers, may not be fully representative of all eye clinics. Future research should investigate the accuracy of billing codes for additional ocular conditions and the extent by which all diagnoses captured in the medical record are reflected on the billing forms.

Given the strong agreement between billing data and patients' corresponding medical records, researchers can confidently use administrative claims data to study these ocular conditions.

Acknowledgments

Financial Support: National Eye Institute K23 Mentored Clinician Scientist Award (JDS:1K23EY019511-01); Blue Cross Blue Shield of Michigan Foundation (JDS); Alliance for Vision Research grant (JDS); VA Health Services Research and Development Career Development Award (KWM)

References

1. Coleman AL, Morgenstern H. Use of insurance claims databases to evaluate the outcomes of ophthalmic surgery. *Surv Ophthalmol.* Nov-Dec;1997 42:271–278. [PubMed: 9406373]
2. Bearely S, Mruthyunjaya P, Tzeng JP, et al. Identification of patients with diabetic macular edema from claims data: a validation study. *Arch Ophthalmol.* Jul.2008 126:986–989. [PubMed: 18625948]
3. Javitt JC, McBean AM, Sastry SS, DiPaolo F. Accuracy of coding in Medicare part B claims. Cataract as a case study. *Arch Ophthalmol.* May.1993 111:605–607. [PubMed: 8489437]
4. Quigley HA, Friedman DS, Hahn SR. Evaluation of practice patterns for the care of open-angle glaucoma compared with claims data: the Glaucoma Adherence and Persistency Study. *Ophthalmology.* Sep.2007 114:1599–1606. [PubMed: 17572498]

Table 1

Proportion of Billing Records Coded Correctly

Ocular Condition *	Number of billing records reviewed	Number of correctly coded encounters	Percentage of encounters coded correctly
Cataract	220	220	100
Glaucoma Suspect	200	194	97
Primary Open Angle Glaucoma	250	245	98
Proliferative Diabetic Retinopathy	166	156	94
Non-exudative Age-related Macular Degeneration	146	134	92

* International Classification of Disease (ICD-9-CM) codes queried: Cataract 366 - 366.4; Glaucoma Suspect 365.0; Primary Open Angle Glaucoma 365.11; Proliferative Diabetic Retinopathy 362.02; Non-exudative Age-related Macular Degeneration 362.51.