

Title: A Retrospective Analysis Using Algorithmic Software To Determine the Missing Rate for ICD and DRG Codes Used to Identify Patient Co-Morbidities.

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Introduction:

The mechanism for recording International Classification of Diseases (ICD) and diagnosis related groups (DRG) codes in a patient's chart is through a certified medical coder who reviews the entire medical record at the completion of an admission. If high-acuity ICD codes are included, coders can add DRG modifiers (CC or MCC), indicating that a patient required escalated hospital resources due to existing comorbidities. We hypothesize that administrative codes are incomplete and we evaluated the incidence of missed ICD codes for the diseases in a cohort of hospital admissions. Secondarily, we evaluate the extent to which missing ICD codes led to an incorrect DRG assignment for the admission, as well as the potential financial impact of these omissions.

Materials and Methods:

This study (IRB# 15-000518) qualified for IRB exception status. All study data were acquired via a previously published Department of Anesthesiology and Perioperative Medicine at UCLA's Perioperative Data Warehouse.¹

Eighteen diseases were selected from the CMS list of disease that met criteria for DRG modifiers, seen in Table 1. Each admission was flagged as having/not having the diseases by algorithm and by billed ICD code. Billed DRG comorbidity level was evaluated in algorithm-positive admissions and flagged when inappropriate. A single relative weighted factor (RWF) point was estimated at \$20,000 for private payors, \$10,000 for Medicare, and \$7,500 for Medicaid. The difference RWF between the actual billed DRG value the algorithm-corrected DRG modifier value was the projected loss.

Results:

Data were analyzed from January 1, 2019 to December 31, 2019. In total, 34,982 hospitalization met inclusion criteria for having at least one DRG assigned to the admission with 34,104 (97.5%) of the admissions had a primary DRG designated. 13,313 (34%) hospital admissions with were flagged as having no corresponding ICD code. 1,035 (3%) admissions were flagged for upgrade from the base DRG to CC modifier, 194 (0.6%) admission were flagged for upgrade from the base DRG to MCC modifier, and 785 (2.2%) admission were flagged from upgrade from the CC modifier to MCC modifier. Accounting for the difference in RWF points between the DRG codes originally assigned to admissions and the DRG codes assigned by the algorithm, then multiplying by the payor-dependent dollar estimated per point, we calculated a loss of \$22,448,800.

Table 1: Results of individual disease algorithms

Algorithm	Total Admission Flagged by Algorithm	Algorithm-Verified Proper ICD Coding	Algorithm-Verified Proper DRG Modifiers
Acidemia	2453	36.8% (34.9%-38.7%)	97% (96.3%-97.6%)
Acute MI	32	87.5% (71.9%-95%)	75% (57.9%-86.7%)
Acute Trop Leak	2631	66.3% (64.5%-68.1%)	96.5% (95.7%-97.1%)
Bacteremia	774	96.4% (94.8%-97.5%)	98.6% (97.5%-99.2%)
Chronic CHF	1363	78.5% (76.2%-80.6%)	97.6% (96.6%-98.3%)
CKD	4325	99.2% (98.9%-99.5%)	97.9% (97.4%-99.3%)
Death	946		97.6% (96.4%-98.4%)
Delirium	710	71.4% (68%-74.6%)	98% (96.7%-98.8%)
Extreme BMI	3931	59.5% (58%-61.1%)	89.8% (88.9%-90.8%)
GCS <= 8	3457	50.4% (48.7%-52.1%)	81.7% (80.4%-82.9%)
Hemodialysis	539	87.4% (84.3%-89.9%)	97.2% (95.5%-98.3%)
HIV	299	95% (91.9%-96.9%)	59.5% (53.9%-64.9%)
Hyponatremia	9772	39.9% (38.9%-40.9%)	95.6% (95.2%-96%)
Pancreatitis	225	80% (74.3%-84.7%)	69.3% (63%-75%)
Post-op anemia	1149	78.7% (76.2%-80.9%)	94.8% (93.3%-95.9%)
Respiratory Arrest	854	96.1% (94.6%-97.2%)	95.6% (94%-96.7%)
TPN	794	86.9% (84.4%-89.1%)	80.4% (77.4%-83%)
Transplant	2801	96% (95.2%-96.7%)	98.2% (97.7%-98.6%)
UTI	2065	74.1% (72.2%-75.9%)	97.5% (96.7%-98.1%)

Conclusion:

In this manuscript, we demonstrate that value of using computer algorithms to identify ICD codes that were not documented in patients' medical records for completed hospitalizations. These missing ICD codes question the validity of using administrative databases and, in many cases, had downstream effects such as incorrect DRG modifiers. Embedding artificial intelligence into this problematic workflow has the potential for improving administrative data, but more importantly, advancing patient care.

Works Cited

1. Hofer IS, Gabel E, Pfeffer M, Mahbouba M, Mahajan A. A Systematic Approach to Creation of a Perioperative Data Warehouse. *Anesth Analg* 2016;122:1880–4.