

Diagnosis Coding Anomalies Resulting in Hemorrhagic Illness Alerts in Veterans Health Administration Outpatient Clinics

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OBJECTIVE

We sought to evaluate the functionality of the diagnosis codes which fall into the syndrome category of hemorrhagic illness.

BACKGROUND

The Veterans Health Administration (VHA) operates over 880 outpatient clinics across the nation. The Johns Hopkins Applied Physics Laboratory's Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE) utilizes VHA ICD9 coded outpatient visit data for the detection of abnormal patterns of disease occurrence.

The hemorrhagic illness (HI) syndrome category in ESSENCE is comprised of 25 different ICD9 codes, including 12 codes specific for viral hemorrhagic fever (VHF) (e.g., ebola, yellow fever, Crimean-Congo hemorrhagic fever, lassa, etc.) and 13 non-specific conditions (e.g., purpura not otherwise specified (NOS), thrombocytopenia, and coagulation defect NOS).

METHODS

A total of 72055 occurrences of outpatient clinic diagnosis codes falling into the HI category for a three-month period (January through March 2007) were analyzed. The frequency of occurrence of specific codes was calculated. Next, we evaluated coding validity by reviewing the electronic medical records of a sub-sample of patients with unusual codes, or codes occurring at a higher than expected frequency.

RESULTS

Coagulation Defect NOS (ICD9 code 286.9) was the most frequently occurring code, and accounted for the greatest number of temporal and spatial alerts. In a random sub-sample of patients with the 286.9 diagnosis code, we noted that patients undergoing anticoagulation therapy with warfarin were being coded as 286.9 rather than the appropriate treatment codes. Additionally, all 7 patients with specific VHF codes were incorrectly coded.

Figure 1: Frequency of occurrence of ICD9 codes in the HI syndrome category, Jan-Mar 2007.

Count of ICD9	(%)	Diagnosis	ICD9 code
1	0.00	ARTHROPOD HEM FEVER NOS	065.9
1	0.00	MOSQUITO-BORNE HEM FEVER	065.4
1	0.00	LEPTOSPIROS ICTEROHEM	100.0
1	0.00	HEM NEPHROSONEPHRITIS	078.6
3	0.00	CRIMEAN HEMORRHAGIC FEV	065.0
5	0.01	EPIDEM HEM CONJUNCTIVIT	077.4
7	0.01	HEMORRHAGIC COND NEC	287.8
21	0.03	HEMORRHAGIC COND NOS	287.9
48	0.07	DROP HEMATOCRIT PRECIP	790.01
71	0.10	HEMOLYTIC UREMIC SYND	283.11
209	0.29	SPONTANEOUS ECCHYMOSES	782.7
367	0.51	PURPURA NOS	287.2
656	0.91	SECOND THROMBOCYTOPENIA	287.4
789	1.09	HEMORRHAGE NOS	459.0
1278	1.77	ABNRML COAGULATION PRFILE	790.92
1390	1.93	THROMBOCYTOPATHY	287.1
10982	15.24	THROMBOCYTOPENIA NOS	287.5
56225	78.03	COAGULAT DEFECT NEC/NOS	286.9
72055	100.00		

CONCLUSIONS

Inclusion of the ICD9 code 286.9, Coagulation Defect NOS, in the HI syndrome category results in an unacceptably high rate of false alarms in the VHA patient sample. Modification of electronic VHA provider coding tools in order to promote more accurate outpatient coding may improve the performance of the HI detection model.

REFERENCES

ICD9 code book, 2006 Edition, Ingenix

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