Validity of Diagnostic Coding of Alcohol Intoxication Associated With Student University Hospital Emergency Department Visits

To the Editor:

Epidemiological studies based on diagnostic codes have reported a rising trend in alcohol-related emergency department (ED) visits. A recent study using a US National ED sample indicated that acute alcohol-related ED visits in adults aged ≥18 years increased 47%, from 1233 in 2006 to 1802 per 100,000 population in 2014 (White et al., 2018). Our cohort study also found that the incidence of student ED visits with alcohol intoxication rose from 45 in 2009–2010, to 71/10,000 person-years in 2014–2015 academic year (Ngo et al., 2018).

Studies validating diagnostic codes have indicated that nearly half of alcohol-related hospital admissions or ED visits were not coded for alcohol-related conditions (O'Farrell et al., 2004; Quan et al., 2008; Wansrisuthon et al., 2017). However, none of these studies evaluated whether there is a change over time in the accuracy of coding. The aim of this study, therefore, was to assess the temporal trend in validity of diagnostic codes recording alcohol intoxication associated with student ED visits in a major public university hospital.

Six hundred student visits to the ED during the 2009–2010 to 2014–2015 academic years were randomly selected for medical record review to identify visits with alcohol intoxication based on clinical presentation and/or
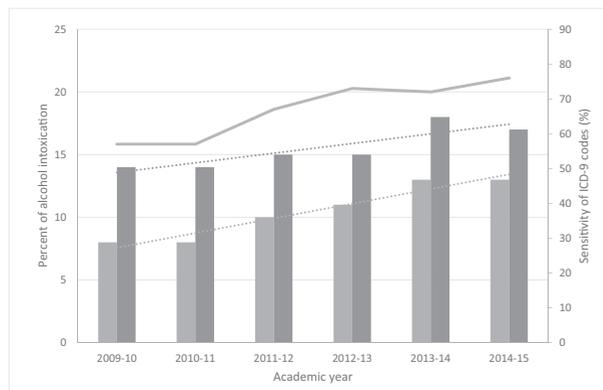

FIGURE 1. Per cent of alcohol intoxication in the reviewed sample identified by ICD-9 codes and by medical record review, and sensitivity of ICD-9 codes (2009/10-2014/15). ICD-9, International Classification of Diseases, 9th edition.

the patient self-report of drinking before the ED visit documented in clinical notes. International Classification of Diseases, 9th edition (ICD-9) diagnostic codes (305.0 and 303.0) identified 64 visits (10.6%) with alcohol intoxication, whereas medical record reviews identified 96 visits (16%). Ethical approval was provided by the university Institutional Review Board. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of ICD codes recording alcohol intoxication visits compared with medical record review were 65%, 99%, 94%, and 94%, respectively. Of 41 visits involving both alcohol intoxication and injury, only 18 visits (44%) were coded for alcohol intoxication. Compared with the multisite validation study (Quan et al., 2008), our study shares similar specificity and NPV, but higher sensitivity (66% vs 54%) and PPV (94% vs 83%). This difference could be explained by the earlier study including both acute and nonacute alcohol-related conditions among patients of all age groups.

From 2009–2010 to 2014–2015, there appeared to be an increase (from 8% to 13%; $P < 0.05$) in the prevalence of alcohol intoxication identified by ICD-9 codes, which was larger than the increase (from 14% to 17%; $P < 0.05$) in prevalence of this condition identified by medical record reviews (Fig. 1). There was also an apparent increase in sensitivity of

clinical codes for alcohol intoxication (from 57% to 76%; $P < 0.05$), whereas specificity, PPV, and NPV were virtually unchanged. This finding indicates that the observed increase in the prevalence of alcohol intoxication could be, in part, due to the increase in sensitivity of coding. Thus, data on alcohol-related ED visits identified from ICD codes should be validated. There is a strong need to improve physicians' coding of alcohol intoxication, especially when it also involves an injury so that code-based data can provide more accurate estimates of the true burden of alcohol intoxication in ED visits.

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