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Carbon Monoxide Poisoning in the Veterans Health Administration, 2010 - 2016

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Objective

To describe characteristics of Veterans Health Administration (VHA) patients with ICD 9/10 CM inpatient discharge and/or emergency department (ED)/urgent care outpatient encounter codes for carbon monoxide (CO) poisoning.

Introduction

It is estimated that in the United States (US), unintentional non-fire related CO poisoning causes an average of 439 deaths annually, and in 2007 confirmed CO poisoning cases resulted in 21,304 ED visits and 2,302 hospitalizations (71 per million and 8 per million population, respectively)[1]. Despite the significant risk of morbidity and mortality associated with CO poisoning, existing surveillance systems in the United States are limited. This study is the first to focus specifically on CO poisoning trends within the VHA population.

Methods

Queries were performed in VA Praedico™ Public Health Surveillance System for inpatient discharges and emergency room and urgent care outpatient visits with ICD 9/10 CM codes for CO poisoning from 1/1/2010 – 6/30/2016. A dataset of unique patient encounters with CO poisoning was compiled and further classified as accidental, self-harm or unspecified. Patients with carboxyhemoglobin (COHb) blood level measurements ≥ 10%[2] for the same timeframe were extracted and merged with the CO poisoning dataset. We analyzed for demographic, geographic and seasonal variables. Rates were calculated using total unique users of VHA care for matching time frame and geographic area as denominators.

Results

There were a total of 671 unique VHA patients identified with CO poisoning. Of these, 298 (44%) were classified as accidental, 104 (15%) self-harm, and 269 (40%) unspecified. A total of 6 patients died within 30 days of their coded diagnosis, however only 1 of these was directly attributable to CO poisoning. The overall rate of CO poisoning over the study time frame was 18 per million unique users of VHA care. CO poisoning diagnoses were obtained from 396 (59%) outpatients, 216 (32%) inpatients, and 59 (9%) patients with both and outpatient visit and inpatient admission. Patients with self-harm classification were less likely to be seen in the ED (only 24 (6%) unique patients compared to 190 (48%) accidental and 182 (46%) unspecified classifications). Of patients seen in the ED and subsequently admitted, patients with the classification of accidental poisoning made up the largest percentage with 36 unique patients (61%). There were 71 (11%) females compared to 600 (89%) males. The highest represented age group was 45-64 with 342 unique patients (51%). Rates by US Census Region were highest in the Midwest and Northeast (27 and 23 per million unique users, respectively) compared to the West and South (15 and 13 per million unique users, respectively) (Figure 1). Accidental CO poisonings showed a seasonal pattern with peaks occurring in late fall, winter, and early spring months (Figure 2). CO poisonings classified as unspecified had a similar but less pronounced pattern, while those classified as self-harm were too few to observe any pattern over time. COHb blood levels ≥ 10% were present in 111 (17%) of patients with CO poisoning codes. Of patients with COHb measures ≥ 10%, those with self-harm classification were least represented with only 7 unique patients (6%). Accidental and unspecified classifications were equally represented with 53 (48%) and 51 (46%) unique patients, respectively.

Conclusions

The impact of CO poisoning on the VHA patient population has not been well studied. The geographic distribution of the majority of cases in the Midwest and Northeast, and the seasonal distribution of accidental cases in colder months seems to be appropriate with respect to what is known of unintentional CO poisoning as often associated with heat-generating sources[3]. Opportunities for further investigation include how potential CO poisoning cases are evaluated in VHA given the low percentage of cases with COHb blood level measurements.

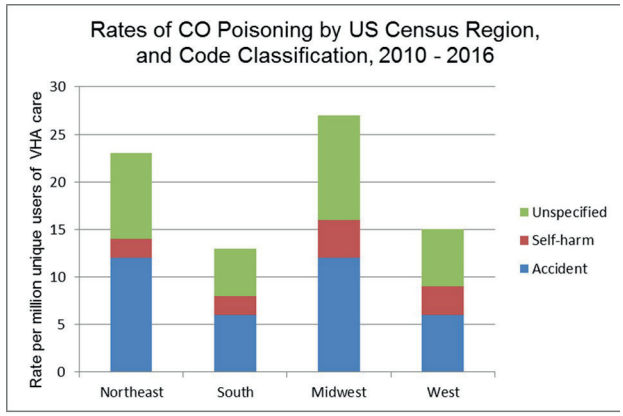

Figure 1

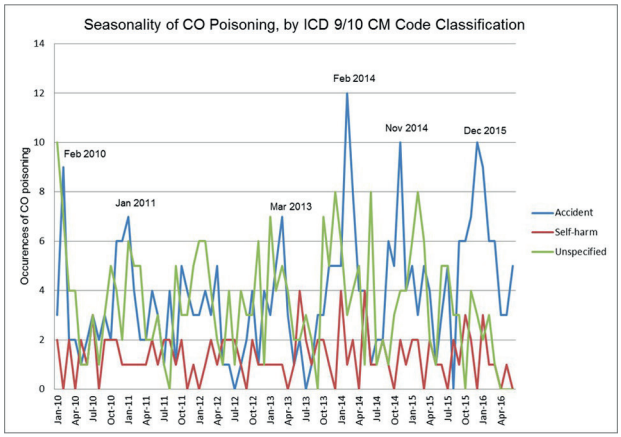

Figure 2

Keywords

carbon monoxide; Veterans Health Administration; non-infectious disease surveillance

References

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