A model of big data linkage to monitor student emergency department visits with alcohol intoxication & associated risk markers in a United States public university

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Declaration of Interest

The authors have no potential conflict of interest to report.
INTRODUCTION

- To date, self-report surveys on a sample of students using the binge drinking threshold is the primary source of data to identify at risk drinkers and monitor the burden of alcohol misuse among university students.

- Surveys are subject to certain limitations due to refusal, non-response, reporting or recall bias, which is subject to misclassification of student drinking amount.

- Limited research has focused on evaluating student hazardous drinking based on clinical data.

- Our research presents a novel data linkage model to monitor the burden of alcohol intoxication associated with student emergency department (ED) visits ascertained from ED medical records in a US public university.
METHODS

An integrated student dataset capturing the entire university student population was created by linking the following student datasets:

- **Student Information System (SIS)** records data for every student at each enrollment, including demographic, academic, campus-related characteristics and organizational affiliation.

- Student data were linked to the electronic medical record (Epic) and subsequent ED visits with alcohol intoxication identified using ICD codes documented in the electronic medical records commencing in 2009-2010 academic year.

- Data were further linked to clinical risk markers (e.g., depression, anxiety, injury) and services access that were abstracted using ICD codes from the Student Health Medical Center electronic medical record (Medicat) – a primary healthcare facility.
Student Information System

- Age
- Gender
- Ethnicity
- Academic Level
- Athletic scholarship
- Fraternity/Sorority
- Military Veteran
- First Generation
- Financial Status
- Transfer Student
- International Student
- Scholarship
- Grade Point Average
- Clubs
- Leadership Roles

Student Health System

- Electronic Medical Record (Medicat)
  - Primary Care Visits
  - Counseling Visits
  - Psychiatric Visits
  - Disability Access Accommodations

- University Health System (Epic)
  - Emergency Department Visits
  - Inpatient Services
  - Outpatient Services

University Dean's Database

- (Safe Grounds)
  - Interactions
  - Threat Assessment Team
  - Citations
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METHODS: DATA SOURCES AND DATA LINKAGE
KEY MILESTONES

- As of 30 Jun 2017: an integrated dataset captured 277,694 students enrolled in the university in 8 (2009-2017) academic years, which were linked to 12,450 student ED visits (linkage rate = 99%) of which 1,274 (10.2%) were associated with acute alcohol intoxication.

- The dataset allows for:
  - Longitudinally follow up every student over the course of study at the university for any risky drinking event including alcohol intoxication resulting in ED visits.
  - Tracking the temporal trends in prevalence and incidence rate of alcohol intoxication associated with student ED visits.
  - Documenting a range of demographic, academic characteristics, organizational affiliation (fraternity member) and extra-curricular activities (athletic scholarship), and clinical histories (e.g., depression, anxiety, injury).
  - Developing a risk predictive model to generate a risk score for every student at the time of enrollment and identify students at higher risk for timely referral to available outreach education and services.
SEVEN YEAR TRENDS IN THE INCIDENCE OF STUDENT ALCOHOL INTOXICATION ASSOCIATED WITH ED VISITS

![Graph showing the incidence rate per 10,000 person-years from 2009-10 to 2015-16. The rates are as follows: 2009-10: 45, 2010-11: 51, 2011-12: 59, 2012-13: 55, 2013-14: 73, 2014-15: 71, 2015-16: 64. The trend shows an increasing incidence rate over the years.]