Locating Alcohol and Substance Violations

Tufts University Medford Campus, Medford/Somerville, MA

Introduction

Significant level of alcohol and drug consumption among college students often leads to negative health consequences as well as undermines overall well-being including academic and social performance. Thus, alcohol and substance violations pose a major public health risk on campus that requires policy interventions. At Tufts University’s undergraduate campus in Medford/Somerville, MA, alcohol issues often draw administrative attention after university-wide events. However, on a daily basis, Department of Health and Alcohol Education (Health Ed) receives reports of incidents from TUPD, RA’s and other students. Tufts Emergency Medical Services and Somerville or Medford EMS have been readily responding to students whose alcohol drug-relates conditions are perceived as serious enough for medical assistance. Such post-event emergency services alone only cover the aftermath of an abusive event. Preventative measures are needed to avoid health damage from the first place. In order to use limited resources on optimal targets, colleges need to identify violation patterns on campus for effective alcohol/drug policy programs. A review of literature shows that time, gender, year of class vary in the level of college-setting alcohol and substance abuse. In this project, mapping-violation data of cases recorded by Health Ed between 2006.9 and 2013.9 was aimed to reveal patterns of abuse on campus and inform policy making at Tufts. Specifically, the project tried to spatially determine vulnerable locations according to alcohol, Marijuana, and drug violations among freshmen, sophomores, juniors or seniors. Adjusted counts were excluded. 4. ArcGIS Symbology — Stacked Chart. Visualizing the composition of violations at each location according to status as freshmen, sophomores, juniors or seniors. One counts locations were excluded. 5. ArcScene (3D)
The focus now turned to residential locations on campus. Most of the cases were found at residential locations on campus where policy interventions are also more easily targeted. The project also sought to detect differences between incident locations and residences. A Contour layer was used to create a Triangulated irregular network (TIN). Then all the feature layers were draped onto TIN for symbology analysis. 3D buildings at the incident locations or the residences were created according to the number of counts at residential locations including Greek houses and on-campus residences. Comparison and contrast is enabled between 1) Total counts and average severity at violators’ residences 2) Size-Adjusted Counts and average severity at violators’ residences

Methodology

The dataset obtained from Health Ed has a range of attributes including gender, time, date, class year, status, type of violation, necessity to be transported to a hospital. The dataset also contains two spatial components for each individual recorded: the location of incident and his/her residence. Each column was geocoded to a point layer using the address locator of on-campus locations at Tufts. Then, two kinds of spatial join were performed between the point layers of individuals and the polygon layer of on-campus locations. 1) Joining point to polygon for a resulting polygon layer. 2) Joining polygon to point for a resulting point layer. Counts of each attribute in the resulting layers are used for further spatial analysis. 1. ArcGIS Point Density under Spatial Analyst

Conclusion

1. Two clusters of locations as shown in darker blue were identified to be the most vulnerable areas on campus taking into account of both incident number and severity. One is located at the uphill residential area and the other one is located at the downhill residential area.

2. Besides prevalent around on-campus residences, Marijuana violations were found in two non-residential locations — Tisch Library/Library Roof and Hillel Center.

3. More males were reported with violations than females on campus. However, several locations had more female cases than male cases including exterior such as Hodgdon, a residential hall with 100% female cases.

4. Because freshmen and sophomores are required to reside on campus, it is reasonable to see them having the majority of the incidents. Every class year has dropped incidents as they rose status but the trend of the violations generally increases with class year suggesting a worsening pattern of abuse throughout recent years. Freshmen remain the focus of alcohol and substance education and residential halls with more freshmen should be the targets of education programs. Meanwhile, each location does present a differentiated pattern of ratio between incident number and severity. One is located at the uphill residential area and the other one is located at the downhill residential area. Each column was geocoded to a point layer using the address locator of on-campus locations at Tufts. Then, two kinds of spatial join were performed between the point layers of individuals and the polygon layer of on-campus locations. 1) Joining point to polygon for a resulting polygon layer. 2) Joining polygon to point for a resulting point layer. Counts of each attribute in the resulting layers are used for further spatial analysis.

5. Trends in incidents by status of the larger residential halls still remained tall (or became taller) including Hill Hall, Haskell Hall, Tilton Hall, Linbury and West Hall. These dorms should receive further attention as policy targets. The adjusted map also presents a clearer pattern of violations among the Greek houses, aka, the fraternity brothers and the sorority sisters. Some chapters (e.g. D.U. — Delta Upsilon) requires more policy interventions than the others due to their considerably higher counts and/or severity among the Greek houses.

Limitations

Due to the constraints on reporting cases at the time of emergency, the dataset might not reflect the full extent of alcohol and substance violations on campus. Over 300 Cases out of 1294 cases in the dataset could not be matched by the address locator because of missing accurate location data.