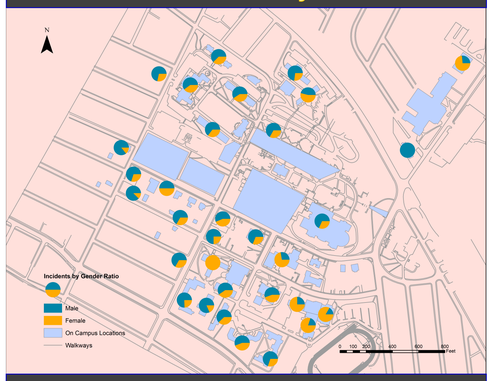
Locating Alcohol and Substance Violations

Tufts University Medford Campus, Medford/Somerville, MA

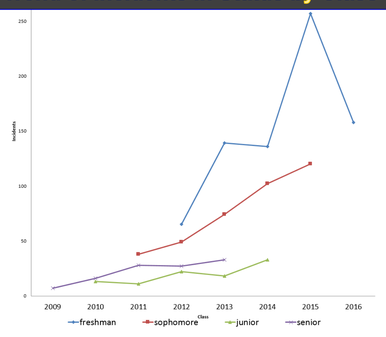
2. Incidents Density by Violation Type

3. Incidents Ratio by Gender



4. Incidents Ratio by Status

5. Trend of Incidents in Status by Class Year

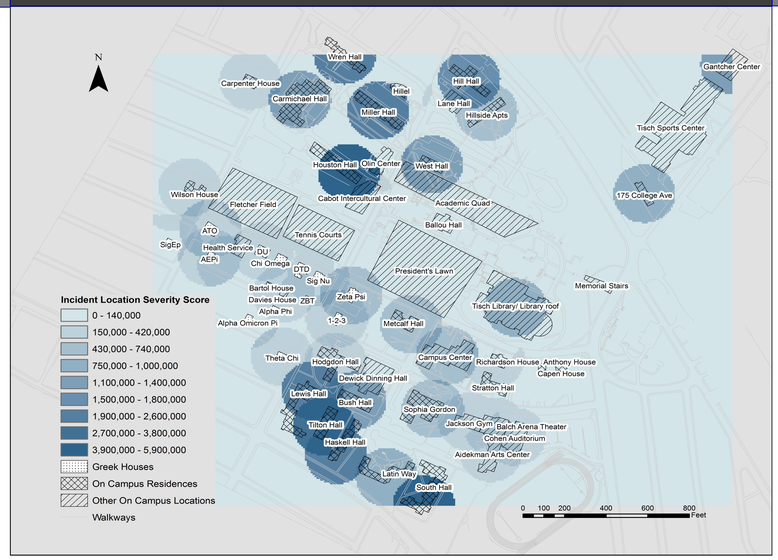


Introduction

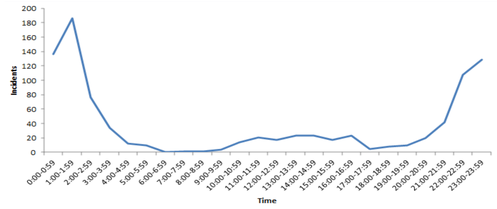
Significant level of alcohol and drug consumption among college students often leads to negative health consequences as well as undermines overall well-beings including academic and social performance. Thus, alcohol and substance violations pose a major public health risk on campus that requires policy 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, RAs and other students. Tufts Emergency Medical Services and Somerville or Medford EMS have been readily responding to students whose alcohol/ drug related conditions are perceived as serious enough for medical assistance. Such post-event emergency services alone only cover the aftermath of an abuse event. Preventative measures are needed to avoid health damage from the first place. In order to use the 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 2008.9 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 accord-

1. Sum Severity of Incidents at On-Campus Locations



6. Trend of Incidents by Time of the Day



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

Presenting the sum severity of incidents at on-campus locations. Individual severity score ranged from 0-2 depending on the necessity to transport that person to a hospital.

Sum severity score = ∑ (individual severity score) at each location.

2. ArcGIS Symbology– Density

Visualizing the distribution of violations according to alcohol, Marijuana, and drugs.

3. ArcGIS Symbology— Pie Chart

Visualizing the ratio between females and males at each location. <4-counts locations were excluded.

4. ArcGIS Symbology— Stacked Chart

Visualizing the composition of violators at each location according to their status as freshmen, sophomores, juniors or seniors. <4-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 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

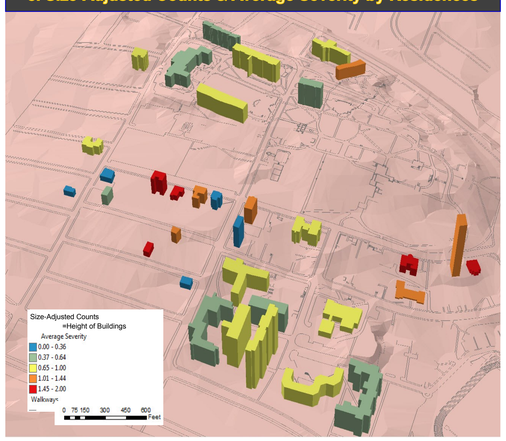
2) Size-Adjusted Counts and average severity at violators' residences

Counts were adjusted by sizes of the residential locations (total number of residents

7. Total Counts & Average Severity by Incidents at Residences

8. Total Counts & Average Severity by Residences

8. Size-Adjusted Counts & Average Severity by Residences



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 ones including extremity such as Hodgdon, a residential hall with 100% female cases.
4. 5. 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 by status, which suggests the need of tailored proportions of educational materials if they are designed for different statuses.
6. High frequency of incidents starts from 22:00 and ends at 2:59 while the peak is from 1:00-1:59. This could provide insights into resource and human capital distribution for TEMS. Further research is needed to investigate whether these times correspond with parties or pre-gaming events.
7. 8. Residential locations by incidences and by residences do not match in terms of number of cases nor average severity. Some locations have more incidents while others are resided with more violators. The difference can be seen both among on campus residential halls and among Greek houses. Thus, dorms/ Greek houses that seemed to host more parties should receive tailored policy interventions on hosting parties while dorms/ Greek houses that seemed to have more vulnerable student population should receive tailored policy interventions such as strategies that restrain alcohol/ substance consumption for individuals.
8. 9. After the extent of violations in counts and severity was adjusted by the total number of residents in that location, some of the larger residential halls still remained tall (or became taller) including Hill Hall, Haskell Hall, Tilton Hall, Latin Way and West Hall. These dorms should receive further attention as policy targets. The adjusted map also presents a clearer pattern of violations among residents of the Greek houses, aka, the fraternity brothers and the sorority sisters. Some chapters (e.g. DU— 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 1284 cases in the dataset could not be matched by the address locator because of missing accurate location data.

Cartographer: Ye Shen I Dec 2013 I Scale(1:40,000)

Map Projection: NAD_1983_StatePlane_Massachusettes_Mainland_FIPS_2001_Feet

Data Source: Tufts Department of Health and Alcohol Education; Tufts GIS drive; MASSGIS