

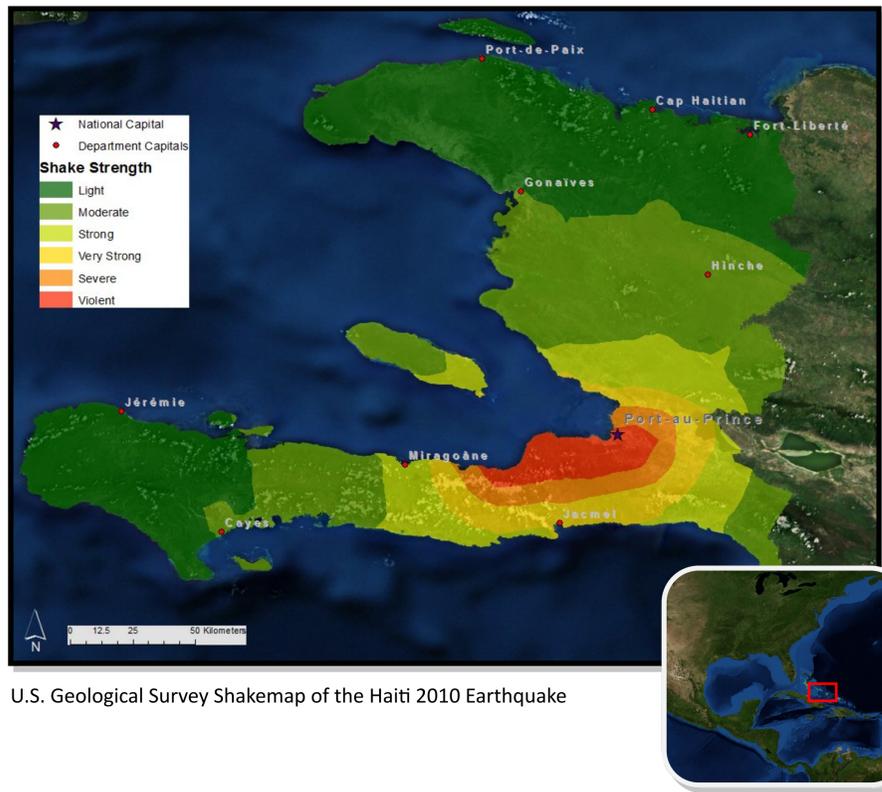
Alcohol and Tobacco Use in Haiti Before and After the 2010 Earthquake

Background

Natural disasters, can be completely unpredictable and horrific. This was especially true for the 7.0 earthquake that shook Haiti in 2010, leaving approximately 316,000 people dead, 300,000 injured, 1.3 million displaced, and 97,240 homes destroyed.[1] The effects of experiencing such trauma can have a long lasting impact on individual as well as community health and well being.

Due to the seriousness of natural disasters, studying the effects that are not necessarily needed help the individual and the community in the direct moment can be challenging. More often then not there are very pressing life or death situations that need the first and foremost attention. Because of this, there are not a significant amount of studies focusing on alcohol, tobacco, or substance abuse after natural disasters. However, this analysis was inspired by two previous studies. The first study analyzed the alcohol sales in Hyogo prefecture, Japan, before and after a major earthquake in 1955. [2]. Another study asked participants in New York, where they were when 9/11 happened and then analyzed their location to the participant's alcohol consumption the week after the terrorist attack.[3]

This GIS analysis aims to see if there is a change in alcohol consumption and tobacco use among Haitian people after the 2010 earthquake. Furthermore, is there a change in use based on the type of alcohol consumed or tobacco product used. Does this change in use have any relationship with where the earthquake shake strength was most violent?



U.S. Geological Survey Shakemap of the Haiti 2010 Earthquake

Discussion

Scientific research has shown that there can be adverse side effects from overconsumption of alcohol and tobacco use. Some side effects include an increased risk of stroke, high blood pressure, liver problems, and a variety of cancers. [6] This analysis will be helpful for the general health of the public, as it highlights an adverse side effect that may not always be associated with a natural disaster.

The strength of this data was the ability to analyze the specific type of alcohol or tobacco product used. This allows for specialized and specific public health interventions. The strengths of the maps is the ability to relate the alcohol consumption and tobacco use to the USGS shakemap, to determine if there is an association between consumption and shake violence.

A limitation of this data is that it does not provide the amount of alcohol consumed or tobacco used. This information would allow for a better interpretation and understanding of the community needs. Having the ability to see how much alcohol was consumed can also help determine if there is a spike in overconsumption/use or if there are merely people who have started to drink alcohol or use tobacco.

Citations:

- [1] U.S. Geological Survey, Department of the Interior/U. S. G. (2012). Earthquake information for 2010, USGS.
- [2] Shimizu, S., et al. (2000). "Natural disasters and alcohol consumption in a cultural context: The Great Hanshin Earthquake in Japan." *Addiction* 95(4): 529-536.
- [3] Hasin, D. S., et al. (2007). "Alcohol consumption and posttraumatic stress after exposure to terrorism: effects of proximity, loss, and psychiatric history." *Am J Public Health* 97(12): 2268-2275.
- [4] ESRI 1999-2014. ArcGIS Desktop: Release 10.3, Redlands, CA: Environmental Systems Research Institute.
- [5] U.S. Geological Survey, Department of the Interior/USGS, U.S. Geological Survey.
- [6] Alcoholism, N. I. o. A. a. Alcohol's Effects on the Body. U.S. Department of Health and Human Services, National Institute of Health.

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PH262—Introduction to GIS
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Data sources:

- Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.
- Haiti Demographic and Health Survey 2012 [Dataset]. HTBR61FL.DTA, HTGE61FL.ZIP. ICF International [Distributor], 2012.
- Haiti Demographic and Health Survey 2005-06 [Dataset]. HTBR52FL.DTA, HTGE52FL.ZIP. ICF International [Distributor], 2006.
- USGS Shakemap: U.S. Geological Survey, Department of the Interior/USGS, U.S. Geological Survey.
- Thank you to: Dr.Thomas Stopka, PhD, Tufts University School of Medicine and Joel Kruger

Methods

The data used for this project was acquired from USAID's Department of Health Survey (DHS). Proper permission for this analysis was received from DHS and the Tufts University School of Medicine Institutional Review Board. All data were de-identified and do not constitute human subject research. To maintain participant confidentiality, DHS randomly displaced all GPS data used.

There were four datasets used in total; two survey datasets and two corresponding GPS data sets. The first dataset is from 2005-2006, the second from 2012. The two survey datasets were then joined to ArcGIS by the survey cluster IDs. [4] The analysis had two focuses: Alcohol consumption tobacco use.

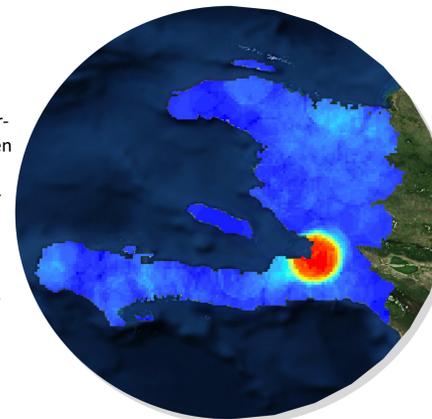
Alcohol data was then divided into those that drank beer, wine and/or tafia. Tafia is an alcoholic drink produced from brown sugar and is similar to rum. The smoking data was divided into those that smoke cigarettes, use snuff, or smoke a tobacco pipe.

The survey responses were binary, and did not allow for analysis of amount of alcohol consumed or tobacco used, but whether the total population of those that used increased or decreased in general. The total sample size for the 2005-2006 and 2012 data was approximately 24,800 and 29,000 participants respectively.

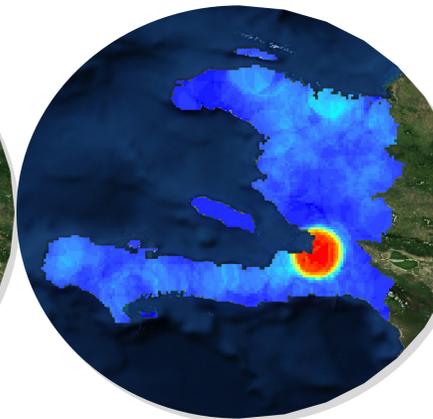
All data were divided amongst the 2005-2006 and the 2012 data. Resulting in 16 different point datasets. A point density analysis was then done on each dataset. Lastly, a change detection analysis was performed to calculate the change between the 2005-2006 and 2012 data.

The shakemap data was created by the United States Geological Survey (USGS).[5] The shakemap was then clipped to the national border of Haiti using ArcGis.

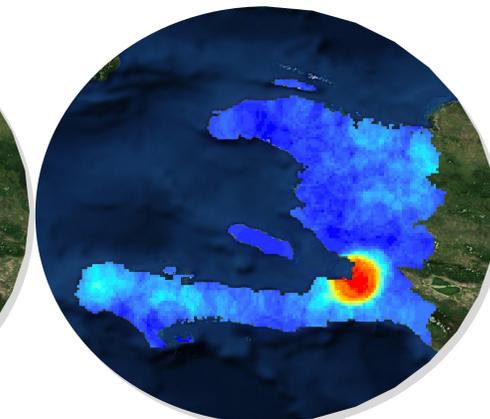
Beer Consumption



Wine Consumption



Tafia Consumption



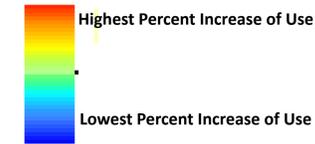
Results

The results of the change detection analysis show that there was an increase in alcohol and tobacco use between 2005-2006 and 2012. For both alcohol and tobacco use the largest percent change increase was seen in the national capital, Port-Au-Prince and nearby areas. The results for the specific type of alcohol use were surprising, in that there was not much detectable change based on the type of alcohol consumed. However, it can be seen in the southwestern and areas that felt "sever" or "very strong" shaking had a faintly more percent increase compared to both wine and beer consumption. That being said, the largest percent increase in the alcohol category was beer consumption, with the highest level being an increase of approximately 544 participants.

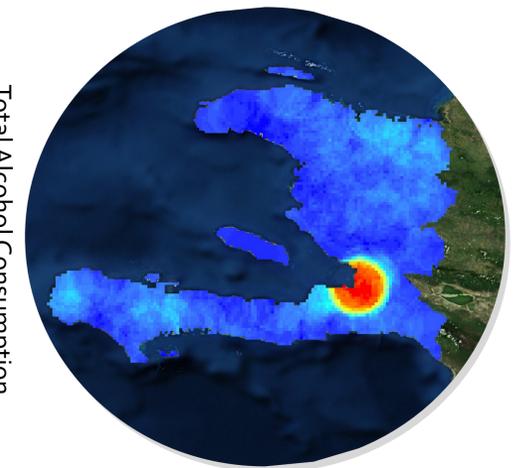
The results from the change detection analysis for tobacco use was quite different from the alcohol analysis. Not only was there a large percent increase seen in Port-Au Prince, but many areas that felt only "light" or "moderate" shaking and/or were over 100 kilometers from the most violent shaking, showed an increased use after the earthquake. The largest percent increase in the tobacco use category was snuff with the highest level of increase at 205 participants.

The results for this analysis separated the population based solely on whether the participant used alcohol or tobacco. In the future, it would be interesting to see the results of those that consume both alcohol and used tobacco.

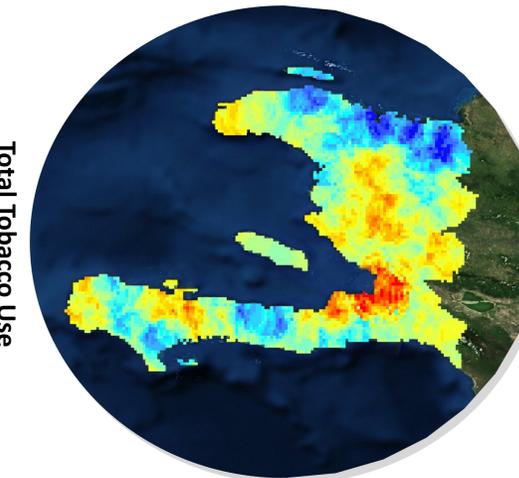
In conclusion, it could be assumed that there was a strong correlation between alcohol use and shake strength of the earthquake, where the most violent shaking was felt, the highest percent increase of alcohol consumption was found. This is somewhat contrasting to the results found for tobacco use as the highest percent increase was not only limited to where the shaking was most violent. Further research is needed to test the strengths of these associations.



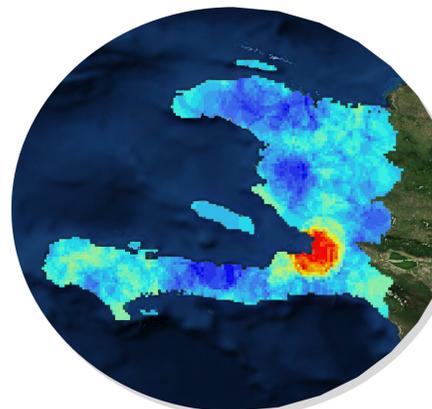
Total Alcohol Consumption



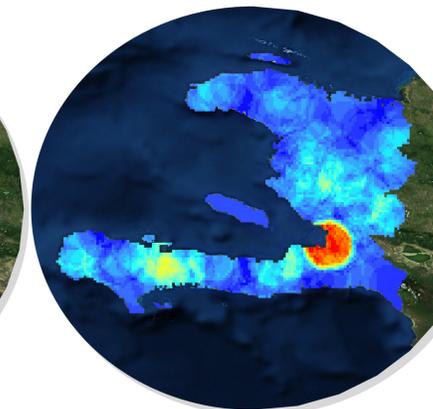
Total Tobacco Use



Cigarette Use



Snuff Use



Tobacco Pipe Use

