Attachment A

SOW-1

-Statement of Work-

Project Title: Evaluating the Impact of the Arlington Restaurant Initiative on Alcohol-Related Crimes

Project Overview: Arlington County features some of the most unique restaurants and nightlife destinations in the Washington D.C. metro region. Areas such as Clarendon, however, with a large number of restaurants have become a difficult issue for police to manage due to alcohol-related crimes such as malicious wounding, sexual assault, public intoxication, assault on police, DUI, disorderly conduct, and rape.

Arlington County Police Department (ACPD) launched the *Arlington Restaurant Initiative (ARI)* that focuses on best practices for restaurants and nightlife to reduce the risk of alcohol-related disorder. The initiative grew out of the *Clarendon Detail*, the creation of a team of patrol officers using overtime to control pedestrian and road traffic, and to ensure that intoxicated patrons are protected from harm.

To sustain this program, ACPD must provide an evidence-based case that the program leads to decline in crime and has positive social and economic impacts.

Objective: The objective of this project is to measure the effectiveness (social and economic impact) of ARI in order to provide the ACPD and stakeholders guidance in policymaking and budget allocation.

Project Approach

The project will develop data-driven methods to measure

- the reduction in alcohol-related crime incidents attributed to the ARI program
- cost-benefit analysis taking into account the reduction in crime and the economic costs of various crime types
- resources that are needed to sustain and support the program
- return on investment

The project will involve three critical components: (1) research will be conducted to understand the social and economic impacts of the ARI program using data collected from the Arlington County Police Department as well as social media, Google, Census, local focus group meeting, and restaurants survey; (2) actively engage students in real-world project-based learning process to expose students to innovative quantitative and qualitative data collection process and impact analysis research designs; and (3) outreach to local communities to collect research data, validate research results, and enhance public participation in the policy decision-making process. This project will provide policy makers and community leaders actionable information regarding the best local community-based practices in preventing and reducing alcohol-related crime.

Social Impact: We will measure the social impact of ARI by considering factors such as the safety of the neighborhood, crime and accidents due to inebriation, and measures of perceived well-being. This will be done by analyzing the crime and emergency incident rates before and after the programs implementation. Given a reduction in crime, it is challenging to identify the causal factors that lead to the observed decline. In order to address that, we will use methods such as difference-in-difference quasi-experiment design to compare the change in social impact before and after the study period to similar neighborhoods (as measured by socioeconomic, lifestyle, and demographic characteristics). In order to quantify these notions, we will use insights from the ACPD in addition to the following **data sources:** (1) 911 call and crime data (quantify change in the incident rates), (2) Clarendon Detail data, (3) Arlington County Fire Department (ACFD) Fire and Emergency Medical Services (EMS) data, (4) American Community Survey (to characterize the demographics of the neighborhoods under study).

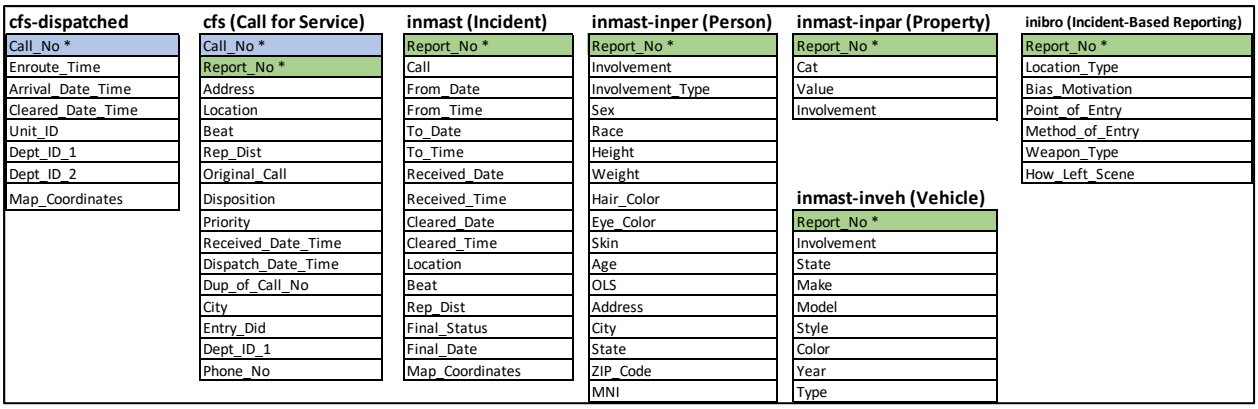
Economic Impact: We will estimate the cost and the cost effectiveness of ARI using the following potential economic impact factors (data accessed through the collaboration of ACPD with other agencies and businesses): (1) Loss/increase revenue of establishments, (2) Reduction in liability insurance, (3) Loss/restriction of Use Permits, Loss of business revenue due to loss of ABC license/Fines and loss of business revenue, (4) Cost of Police and Fire personnel, EMS transports, (5) Uber/Lyft rides and Arlington Taxi companies, (6) Cost in justice system − VA State Courts/Arlington County Commonwealths Attorney Office, and (7) Real estate taxes and property values from Zillow.

Data Request

In order to address the research questions listed above, the specific data that will be needed from ACPD involves:

- Call for service (e.g., 911 calls) with all PHI/PII redacted or removed
- Call for service dispatched with all PHI/PII redacted or removed
- Master incident tables (inmast tables: incident, inibro, person, incident, vehicle, property)
- EMS data at the incident level
- Translation worksheets (codebook)
- Clarendon Detail reports
- ACPD personnel costs, including overtime
- ACPD personnel time devoted to the program

The figure below includes the tables and variables that were provided to us by ACPD through our previous agreement. This dataset covered incidents for the years 2005 through 2015. The datasets and data fields expected from ACPD for this SOW-1 is expected to be substantially similar to what is shown in the figure below.



The data should cover the period before and after the Clarendon Detail was implemented. No personal information will be provided, and as required by the data use agreement, completed project data can be either securely archived on encrypted BI backup servers or destroyed. For data that is to be destroyed, the encrypted LVM partition on which the data is housed is first wiped using the Unix 'shred' utility, overwriting all partition data files three times with multiple patterns by default. After the data is overwritten, the encrypted LVM partition is then destroyed.

Deliverables & Timeline

Deliverable	Timeline
• Obtain, clean, explore, and validate data • Filter, visualize, and prepare data for analysis • Estimate reduction of crimes by types attributed to ARI	August 8, 2019

• Preliminary estimates of socioeconomic benefit (crime reduction and cost of crime)	
• Costs estimates of implementation • Evaluation of implementation (qualitative assessment & validity analysis)	September 25, 2019
• Robustness checks • Draft of final report • Revision with stakeholder comments	November 13, 2019
• Presentation and Final Report	December 4, 2019

Team/Personnel

UVA team will include Gizem Korkmaz (Research Associate Professor), Aaron Schroeder (Research Associate Professor), José Bayoán Santiago Calderón (Postdoctoral Research Associate), and students from the Data Science for the Public Good (DSPG) Program. Corporal Dimitrios Mastoras will be the lead in Arlington County Police Department. Cpl. Matoras is a Master Police Officer and the Restaurant Liaison Officer at ACPD. He oversees the Clarendon Detail officer team and created ARI.

Points of contact:

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The Social & Decision Analytics Division (SDAD) is a leading research group in the Biocomplexity Institute & Initiative at the University of Virginia. BII performs world-class informatics research in life sciences, social sciences, and human health by integrating theory, modeling and simulation with computational and experimental science in a transdisciplinary, team science research environment.

Data Science for the Public Good (DSPG) Program will run for 11 weeks (May 28 - August 9) for graduate fellows and 10 weeks (June 3 – August 9) for undergraduate interns in BII's location in Arlington, VA. DSPG 2019 cohort includes 7 undergraduate interns in various disciplines and 5 graduate students (MS or PhD) with quantitative/analytical skills enrolled at top U.S. universities. Fellows and interns will work in teams collaborating with postdoctoral associates and research faculty from SDAD, and project stakeholders. The research teams will combine disciplines including statistics, data science, and the social and behavioral sciences to address complex problems proposed by local, state, and federal agencies. More information about the DSPG program can be found at https://dspg2019.github.io/.

Data Control Plan

Transfer:

All data sets transferred to SDAD are done so via encrypted means. For remote transfers, a certain set of network protocols are acceptable. Acceptable network protocols for remote data transfer include FTPS, SFTP, SCP, and WebDAV over HTTPS. The SDAD preferred remote transfer method is via an SFTP server temporary established for the purpose of the transfer. The SFTP server is deactivated after successful data transfer. The remote user is provided a temporary password for SFTP server access that is also deleted after successful data transfer. Data sets that are to be transferred manually (not via remote network connection) are transferred using an encrypted USB storage device employing, at a minimum, an EncFS-based encrypted file partition. Email is not considered secure and is not used to transmit covered data unless additional file-level encryption tools, requested and approved by the data provider, are employed (e.g. gpg, ccrypt, 7zip using AES).

Storage:

The data for each SDAD research project is stored on a new project-dedicated encrypted Logical Volume Management (LVM) partition on of our servers. The LVM partition is encrypted using Linux Unified Key Setup or LUKS. This setup is typically referred to as “LUKS-on-LVM”. LUKS is a disk-encryption specification that is based on an enhanced version of cryptsetup, using dm-crypt as the disk encryption backend. Direct access to data sets for loading and management purposes is restricted to project-approved PIs and data managers. The method of access for loading and management purposes is via SSH using RSA encrypted key pairs.

Access:

Copying of server-hosted data down to researcher workstations is not permitted. All data set analyses and results are saved back to the server, not to the individual researcher's workstation. Originally provided data records are accessible via secured remote access only in a read-only format to authorized users. The intention is that original data sets are never modified. Resulting modified read-write data sets that are produced from the original data sets are also stored back to the server and only accessible via secured remote access. Unless special authorization is given, researchers do not have direct access to data files. Instead, data access is mediated by the use of different data analysis tools hosted on their own secure servers that connect to the data server via rsa key-pair authenticated ssh-tunneling on non-standard ports (e.g. ssh -L 54000:localhost:5432 for connection to a PostgreSQL server). For example, if a researcher is going to use the R statistical system to analyze the data records, the researcher will log into the RStudio Server. From RStudio Server, which has been granted limited access to file-based data sets and data records stored in a database, the researcher will run the required analyses. Results of the analyses can only be saved to the researchers home directory on the hosting server. Researchers are not permitted to save analysis results to their office workstations.

Destruction:

As required by specific data use agreements, completed project data can be either securely archived on encrypted VBI backup servers or destroyed. For data that is to be destroyed, the encrypted LVM partition on which the data is housed is first wiped using the Unix 'shred' utility, overwriting all partition data files three times with multiple patterns by default. After the data is overwritten, the encrypted LVM partition is then destroyed.

Signed:

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Arlington County Data Owner/Designee Date

_____ 05/29/2019

University of Virginia Date

UNIVERSITY of VIRGINIA