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Geospatial Analysis of Health, Safety and Alcohol Outlets in Iowa

Report provided to the Iowa Alcoholic Beverages Division

December, 2021



**PUBLIC SCIENCE
COLLABORATIVE**

Report by Shawn Dorius, Kelsey Van Selous, & Cassandra Dorius

Overview

Iowa State University's Public Science Collaborative (PSC) partnered with the National Alcohol and Beverage Control Association (NABCA) and the Iowa Alcoholic Beverages Division (ABD) to better understand the relationship between alcohol outlets and health and safety risk factors in Iowa. The goal of this project was to develop data and analytics to inform the ABD's alcohol education and prevention efforts in the state. We anticipate that these data will also inform public health and community safety programming at the Iowa Department of Public Health, local law enforcement agencies, and in community needs assessments.

Our analysis found a strong and significant relationship between alcohol outlet densities and community health and safety issues such as alcohol-related automobile crashes, violent crimes, and domestic calls for service. Community problems arising from concentrated alcohol establishments place a substantial burden on local resources, including the efforts of law enforcement and human services agencies. We recommend that state agencies and local communities monitor the prevalence and density of alcohol establishments and enact policy reforms to protect communities and families and otherwise mitigate harms arising from dense clusters of alcohol establishments.

For additional questions or information about this report, the data tools described, or the Public Science Collaborative, please reach out to the principal investigators of this study, Dr. Shawn Dorius at sdorius@iastate.edu, or Dr. Cassandra Dorius at cdorius@iastate.edu.



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Why Measure Alcohol Outlet Densities in Iowa?

Alcohol outlet densities (AOD) emerge when licensed alcohol establishments become highly concentrated in close proximity to one another. AODs are a known environmental risk to underage and excess drinking, including binge drinking. Neighborhoods with a high concentration of alcohol outlets such as bars, taverns, liquor stores, breweries, and other alcoholic beverage retailers are at increased risk of violent crime, alcohol-related car crashes, property crimes, and many other health and safety risks. The CDC recommends that alcohol outlet densities and their effects be monitored in local communities. This report uses maps to show the locations and density of alcohol outlets (including outlet clusters) alcohol-related automobile crashes, and alcohol licensing violations across the state of Iowa. We partnered with local law enforcement in four Iowa communities, including Burlington, Cedar Rapids, Iowa City, and Marshalltown, to better understand alcohol outlet densities and their relationship to community safety and wellbeing.

Alcohol outlet clusters are places where five or more licensed alcohol establishments are within .15 miles of at least one other establishment in the cluster.

Alcohol Establishments and Outlet Densities

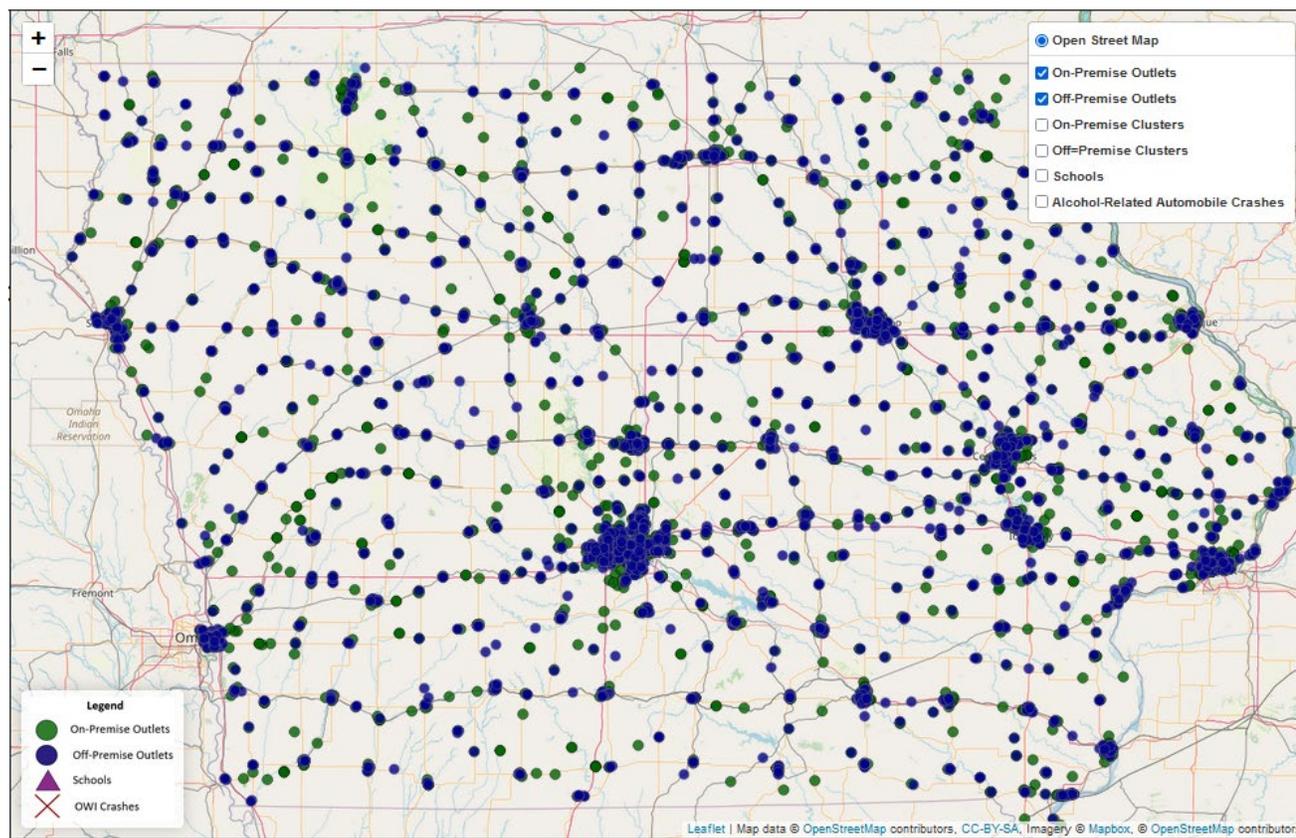


Figure 1. Statewide outlets with ABD issued licenses, 2019



More than 110,000 on- and off-premise alcohol establishments were licensed by Iowa's Alcoholic Beverages Division (ABD) from 2009-2021. Figure 1 maps the locations of licenses in 2019. PSC also created a [web-based, interactive map](#) for communities to explore outlet locations near them.

To further explore alcohol licensing data in Iowa, see here: <https://aripublicsciencecollaborative.github.io/Dashboard/>

Figure 2 illustrates how these data tools can be used to compare alcohol outlet densities in two or more communities. For example, compared to Cedar Falls, Waterloo has many more off-premise alcohol establishments (green dots) and also a significantly larger alcohol outlet cluster (green bubbles). As a result, the residents of Waterloo are at higher risk of excess alcohol consumption and the associated personal and community harms that arise from excess drinking. Unfortunately, the outlet clusters in Waterloo are also concentrated within some of the poorest neighborhoods and among the most vulnerable populations in the city. Cities like Waterloo have many options for reducing health risks and improving safety in their city without compromising economic goals.

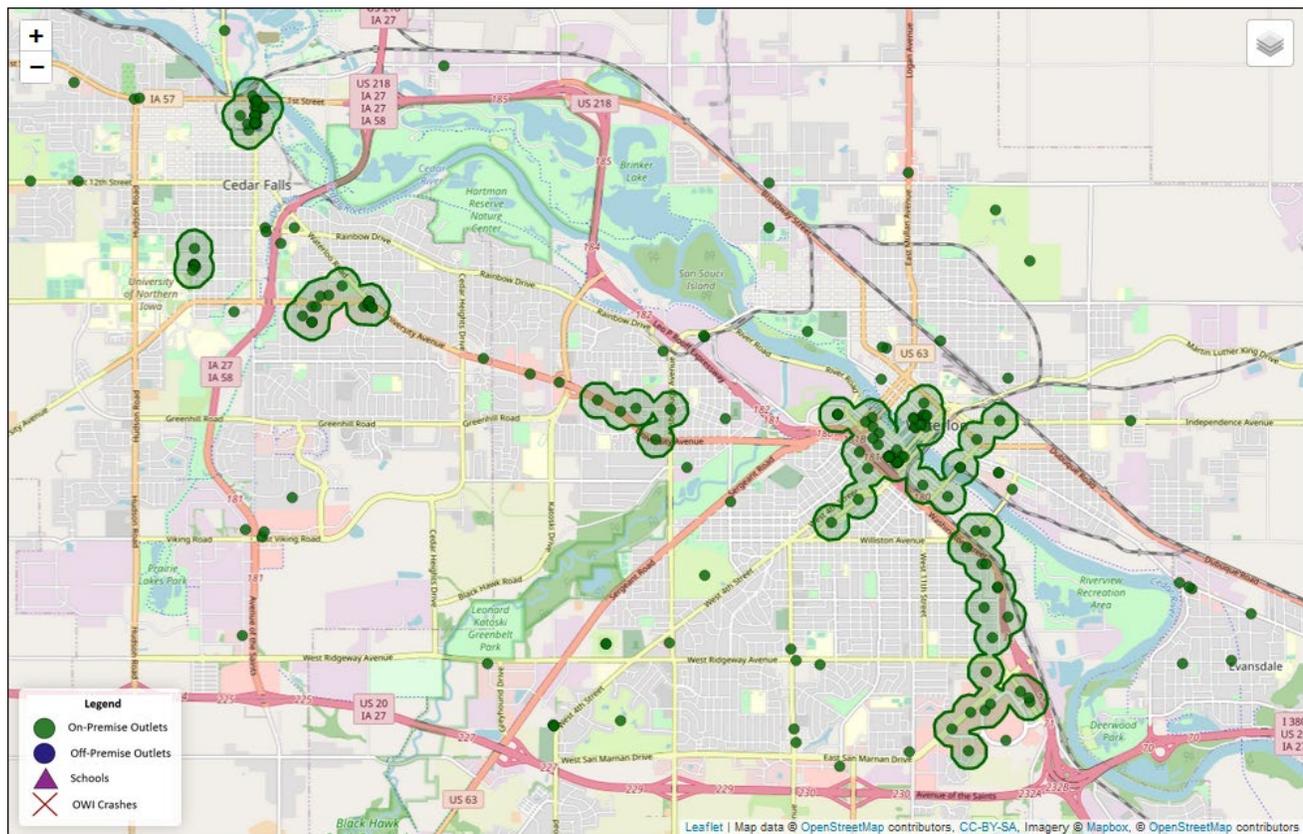


Figure 2. On-premise outlets in Cedar Falls and Waterloo, 2019

Liquor Sales and Alcohol/Tobacco Sales Violations

Liquor (spirits) sales in Iowa are on the rise. The maps in Figure 3 display liquor sales throughout the state in 2010 and 2019. The green circles are scaled to the amount of liquor sold: the larger the circle, the greater the number of total gallons of liquor sold. Comparing 2010 liquor sales in the map on the left to the 2019 sales in



the map on the right shows that the Des Moines area and the Iowa City-Cedar Rapids areas experienced especially large increases in liquor sold. The purple shading indicates the number of people 21 and older that live in each county, with darker shading indicating a populous counties and lighter shading identifying sparsely populated counties. On the surface, rising liquor sales reflect a growing consumer segment, with meaningful sales tax revenue flowing to the general fund and to support public health initiatives. However, excess alcohol consumption also incurs costs on local communities and places an excess burden on first responders, the health care system, and addiction treatment service providers, to name a few. It is recommended that the ABD **consider costs and community harms associated with high and rising liquor sales.**

To further explore liquor sales data in Iowa, see here:

<https://aripublicsciencecollaborative.github.io/Dashboard/Sales/>

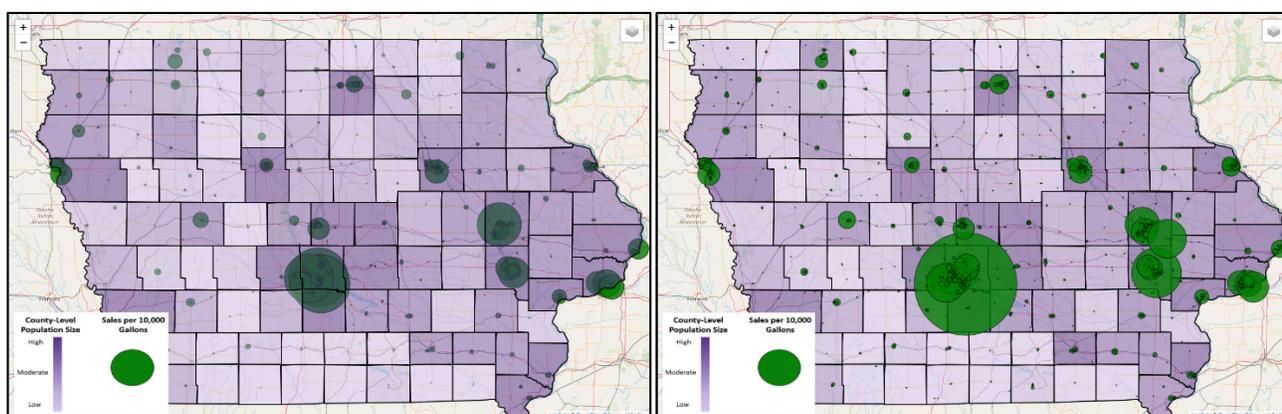


Figure 3. Gallons of Liquor Sold in 2010 (left) and 2019 (right)

‘Sale to minors’ was the single most common type of non-compliance citation in the last 16 years and accounted for 42% of all alcohol licensing violations. Figure 4 identifies the location of tobacco retailer compliance inspections in the state in 2019 (left). The grey diamonds show where a compliance inspection occurred and the red diamonds show where the inspection resulted in a citation for violation of code. The map on the right displays the location of alcohol violations, with red circles indicating that the violation involved sales to a minor and the grey circles identifying all other violations. Comparing differences between tobacco and alcohol inspections and violations yields an interesting observation. Tobacco inspections are spread relatively evenly along the state highway system, while the alcohol violations are more concentrated in Iowa’s population centers. The patterning of tobacco inspections indicates that outlets along the state highway system are the most likely to be targeted for inspection. While it is true that most of the major cities and towns in Iowa are clustered along the highway system, there is no density of inspections within population centers, suggesting that larger towns are being under-monitored. The patterning for alcohol outlets is the opposite, with a much more concentrated enforcement effort according to population size. Evidence shows that compliance checks and enforcement mechanisms such as meaningful **fines and revocation of licenses are effective strategies for protecting public health.**

42% of all alcohol compliance violations between 2005 and 2021 were due to sales to a minor.

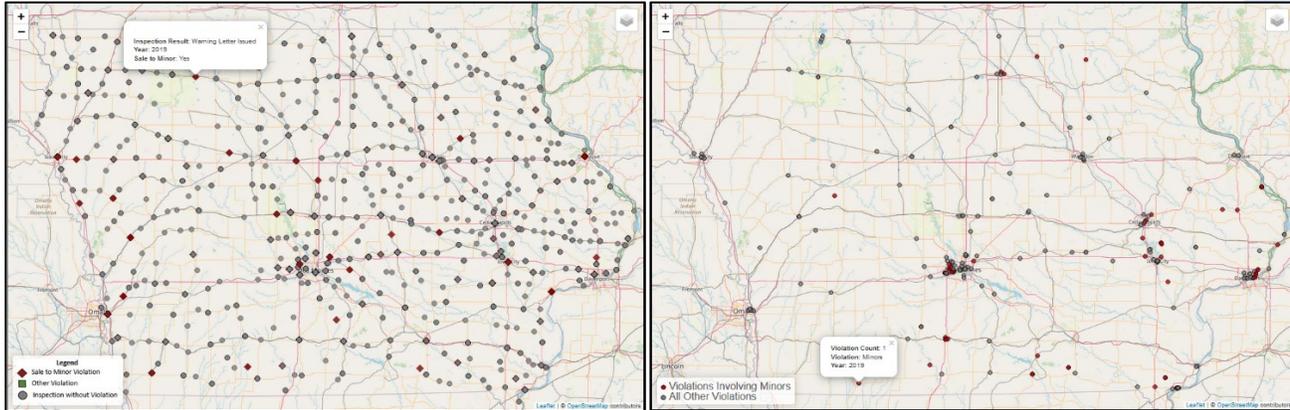


Figure 4. Statewide Map of 2019 Tobacco Sales Violations (left) and Alcohol Sales Violations (right)

Off Premise Outlet Clusters in Proximity to Schools

Research shows that when minors live, play, and go to school near dense clusters of alcohol outlets, there is an increase in the risk of underage drinking, which in turn elevates the life-time risk of harmful excess drinking. For this reason, we recommend the ABD and local communities consider proximity of alcohol establishments to schools, parks and other community features where children congregate. Figure 5 maps an off-premise outlet cluster in Iowa City (left) and Burlington (right), with the blue shaded area capturing the high-risk zone of the outlet cluster and the purple triangles identifying the locations of schools. The Iowa City map identifies three schools in the downtown cluster on the north side of the University of Iowa campus. The Burlington map identifies an outlet cluster that exposes children attending Burlington Christian School to an elevated risk of alcohol harms. It is recommended that **proximity to where minors live, play, and go to school be considered when licensing new establishments.**

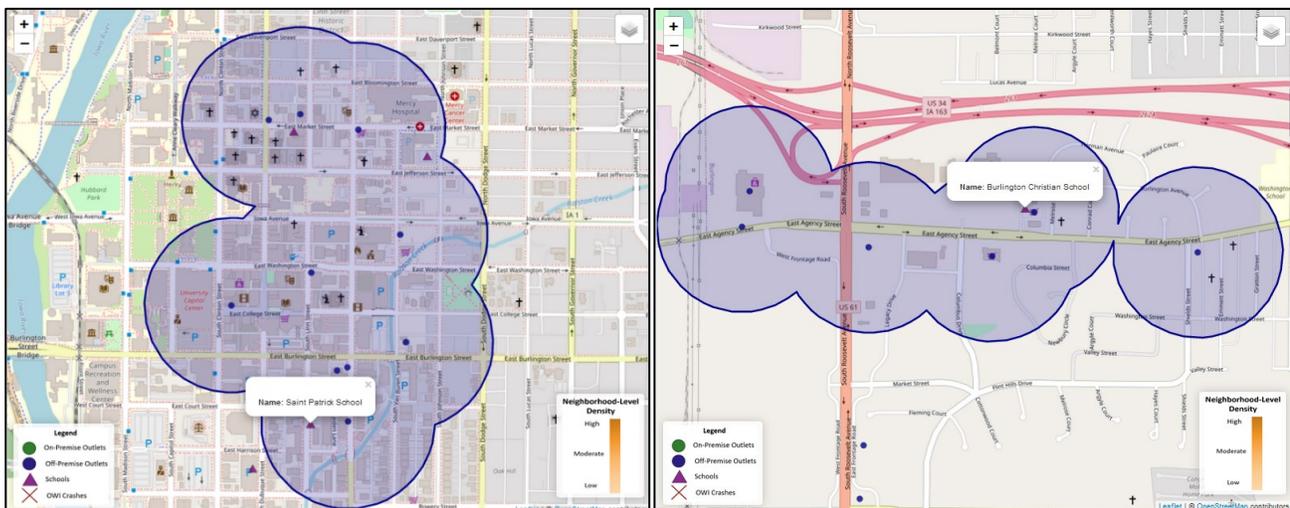


Figure 5. Schools in an alcohol outlet cluster in Iowa City (left) and Burlington (right), 2019



On-Premise Establishments and Alcohol-Related Automobile Crashes

Operating a vehicle while intoxicated is a high-risk activity that can result in property damage, injury, and death. On-premise alcohol outlet clusters have a statistically significant association with alcohol-related automobile crashes. Figure 6 maps the locations of bars, taverns, and other on-premise alcohol establishments in Marshalltown as well as all alcohol-related crashes attributable to vehicle operation while intoxicated. OWI crashes are clustered near on-premise outlets, including the on-premise outlet cluster identified in our analysis. Our analysis indicates that there is a **statistically significant relationship between OWI crashes and on-premise outlet clusters** in Marshalltown.

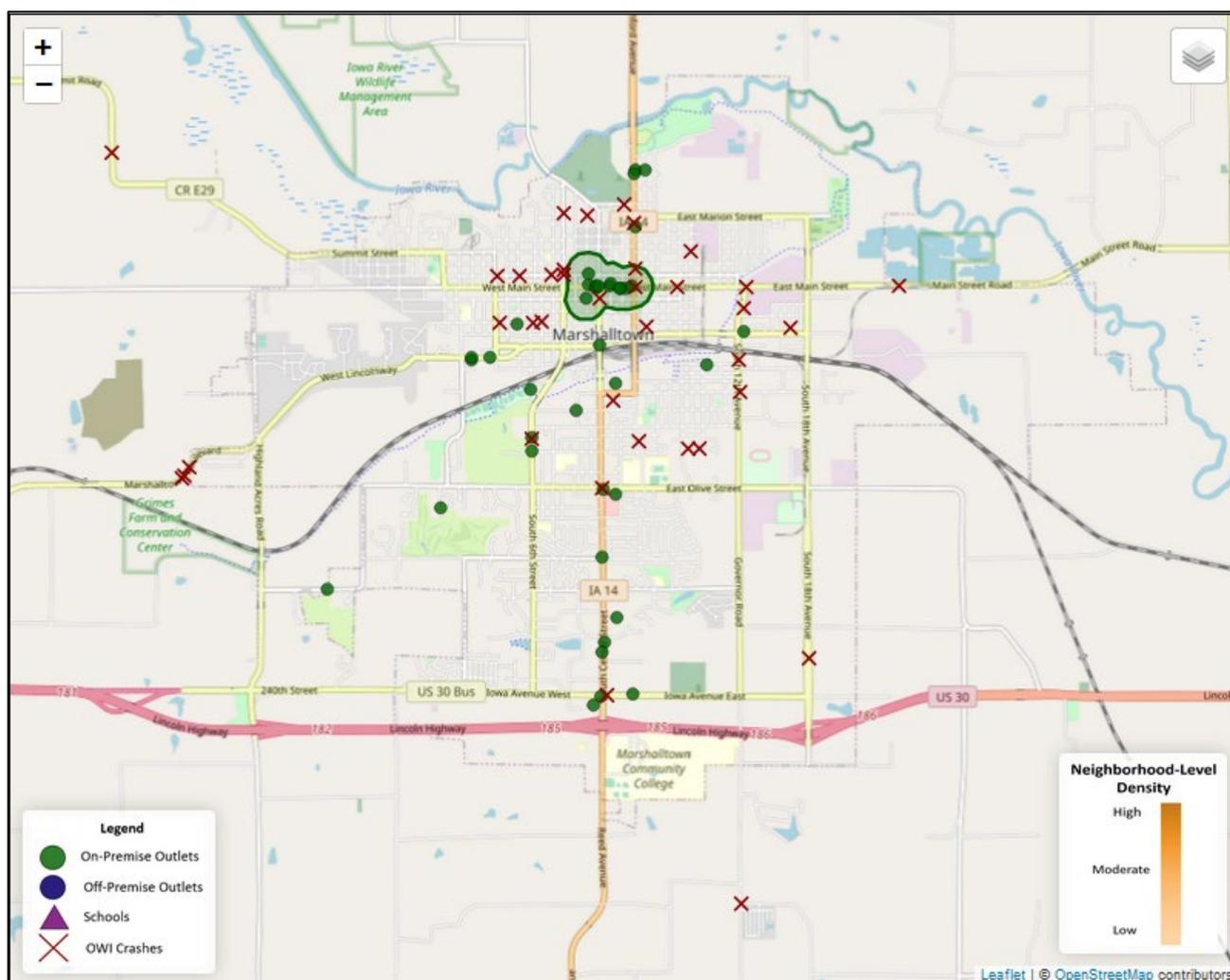
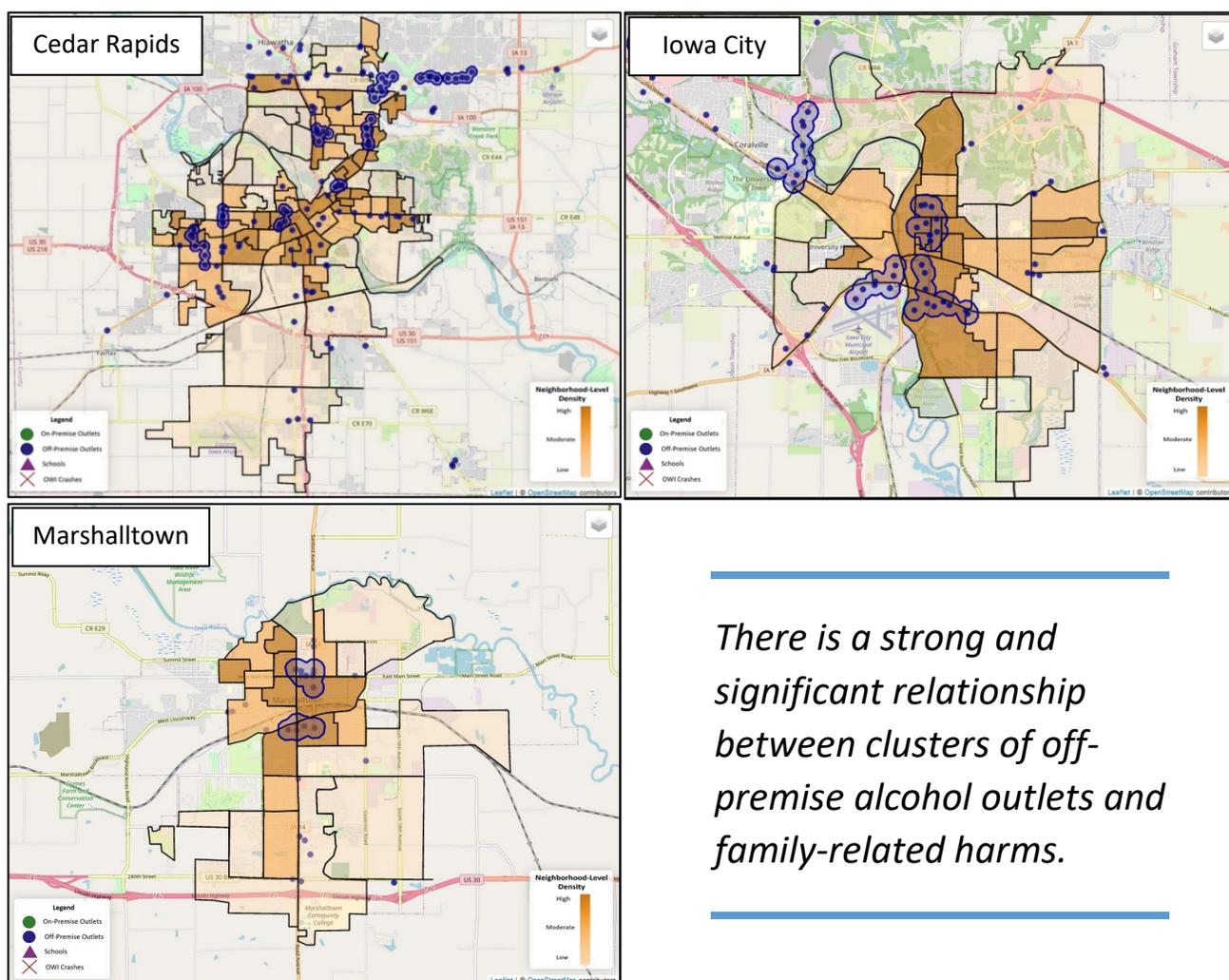


Figure 6. Alcohol-related automobile crashes near on-premise alcohol establishments in Marshalltown, 2019



Off-Premise Establishments and Family Calls for Service

Off-premise alcohol establishments are a known environmental risk factor for community safety and public health. Places with a high concentration of gas stations, liquor stores, and other off-premise alcohol outlets are at elevated risk of violent crime, domestic disturbances, robbery, and other community ills. Taking a closer look at three cities, we find that **neighborhoods with a high number and density of off-premise alcohol establishments also have a high number of family-related calls for service, including domestic disputes, child and elder abuse, child welfare incidents, and violations of no-contact orders.** According to research conducted in other states, there is likely a causal relationship between clusters of off-premise outlets and family-related harms. Our analysis of data for four cities in Iowa establishes a large and statistically significant relationship between outlet clusters and community harm. To further explore alcohol establishments, outlet densities, and their proximity to schools, OWI crashes, and a range of neighborhood safety attributes in the towns of Burlington, Cedar Rapids, Iowa City, and Marshalltown, see here: <https://aripublicsciencecollaborative.github.io/Dashboard/Health/>

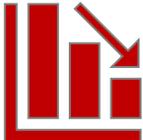


There is a strong and significant relationship between clusters of off-premise alcohol outlets and family-related harms.

Figure 7. Family-related calls for service near off-premise alcohol establishments in Cedar Rapids (top left), Iowa City (top right), and Marshalltown (bottom left), 2019



Recommendations

	<p>Data Driven Decision-Making. With up-to-date, high-quality data, and easy-to-use data tools, the ABD and local communities are better positioned to enact targeted enforcement and harm-reduction initiatives that keep our communities safe without compromising economic opportunities. Toward this end, the Public Science Collaborative encourages the ABD to further leverage their own data holdings, in conjunction with public and private data sets, to support data-driven decision making by division leadership. Data tools such as the maps and interactive dashboards prototyped here can be used by the ABD, city leaders, including local zoning commissions, community advocacy groups, law enforcement partners, and public health officials, to name a few. We recommend that these tools be further developed and expanded, following input from intended users. Public health data might strengthen compliance efforts by targeting areas with high prevalence of underage smoking, for example.</p>
	<p>Enhanced Enforcement. Among the most effective tools available to minimize the harms associated with excess alcohol consumption involve the enforcement mechanisms of regulatory agencies such as the ABD. With the substantial growth in alcohol production and consumption in Iowa over recent years, it is recommended that the state likewise increase the number of alcohol compliance officers charged with enforcing alcohol laws. We encourage the ABD to consider increasing fines for licensee violations, including for establishments that have a history of non-compliance. Minimum unit pricing is another effective tool to reduce excess drinking and its associated harms to individuals, families, and communities.</p>
	<p>Consider Alcohol Outlet Densities. Alcohol outlet densities (AOD) constitute a unique public health and community safety risk factor, above and beyond the presence of any one alcohol establishment. When outlets become concentrated in one area, market forces encourage price wars, more aggressive advertising, and other outlet operator behaviors that contribute to excessive drinking and undermine community safety. For this reason, it is important for the ABD to monitor AODs and consider them when issuing new licenses and renewing existing ones.</p>
	<p>Partner with Local Communities. Local community leaders, law enforcement agencies, public health departments, and community organizations are valuable partners. Connecting these and other partners with the rich and timely ABD data concerning alcohol licensing, liquor sales, and alcohol compliance/enforcement can empower communities to develop public health and safety solutions that align with local risks and community values. When ABD data are linked to user-friendly data tools, community-based partners are well-positioned to develop innovative, localized solutions to the problems they face. Establishing improved dialogue between local communities and the ABD can enhance trust, collaboration, and feedback from local communities to state agencies concerning alcohol outlet density risks.</p>