Research shows cocaine trafficking adapts to law enforcement efforts

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Dr. Nicholas Magliocca is an assistant professor of geography at The University of Alabama. Credit: The University of Alabama

The success of illegal drug trafficking through wider and wider swaths of Central America is a consequence of law enforcement activity to

curtail it, according to new research led by The University of Alabama.

A model developed by Dr. Nicholas Magliocca from UA and others from around the country found the cat-and-mouse game of cocaine smuggling and government interdiction strategies results in a larger geographic area for trafficking with little success in stopping the drug from reaching the United States.

They published their findings today in the *Proceedings of the National Academy of Sciences*.

"This work demonstrates that supply-side counterdrug strategies alone are, at best, ineffective and, at worst, intensifying the trafficking problem," said Magliocca, UA assistant professor of geography and lead author on the paper. "These networks have demonstrated their ability to adapt to interdiction efforts, identifying and exploiting new trafficking routes in response."

Efforts by the United States to curtail illegal narcotics from getting into the country by smuggling routes through Central America over the past decades have been costly and ineffective. In response, traffickers adapt their routes and mode of transit, adjusting their networks to exploit new locations.

As a result, the space drug traffickers use has spread from roughly 2 million square miles in 1996 to 7 million square miles in 2017, according to Magliocca.

Current approaches to studying or modeling the cocaine supply chain overlook the transit zone between production in South America and drug users in North America, Magliocca said.

Researchers used unclassified data sources that describe the volume and

timing of cocaine flows throughout the Central American transit zones. The trafficking routes are not mapped or known, but many government, military and academic institutions have tried to infer route locations based on circumstantial evidence or classified intelligence, Magliocca said.

The team developed a geographic agent-based model to investigate the decision-making processes of smugglers and the effects on cocaine trafficking networks as well as how the networks adapt to interdiction efforts.

"This model gives us the tools to look within the transit zone to see the consequences of interdiction," Magliocca said. "It provides a virtual laboratory for exploring alternative interdiction strategies and scenarios to understand the unintended consequences over space and time."

The model demonstrated cocaine trafficking is widespread and difficult to eradicate because of interdiction, and increased interdiction will continue to spread traffickers into new areas, allowing them to continue to move drugs north.

A wider network becomes more costly to monitor and enforce, and increased efforts to stop trafficking increase the risk and, thus, the profits of smugglers, Magliocca said.

"The adaptive responses of narco-traffickers within the transit zone, particularly spatial adjustments, must be understood if we are to move beyond reactive counterdrug interdiction strategies," he said.

The model will help Magliocca and another team of researchers from UA and Ohio State University investigate the effectiveness of alternative interdiction strategies through a project supported by the National Science Foundation.

More information: Nicholas R. Magliocca el al., "Modeling cocaine traffickers and counterdrug interdiction forces as a complex adaptive system," *PNAS* (2019). www.pnas.org/cgi/doi/10.1073/pnas.1812459116

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