MEXICAN DRUG WAR APPEARS TO HAVE INCREASED THE AVERAGE HOMICIDE RATE IN REGIONS SUBJECTED TO INTERVENTIONS

ALEXANDRIA, VA, APRIL 2, 2015 – A new statistical analysis suggests that, in the short term, the Mexican government's war against drugs increased the average murder rate in regions subjected to military-style interventions.

The study—"Did the Military Interventions in the Mexican Drug War Increase Violence?"—was conducted by Valeria Espinosa, a quantitative analyst at Google and a 2014 doctoral graduate of Harvard University's statistics department, and Donald B. Rubin, Harvard University John L. Loeb Professor of Statistics.

The paper is published on the website of *The American Statistician*, a journal of the American Statistical Association (ASA). The ASA is the nation's oldest and largest organization of professional statisticians.

The Mexican government—beginning in December 2006 during former President Felipe Calderón's term and continuing through current President Enrique Peña Nieto's administration—has been fighting an internal war against drug traffickers. A 2013 report by Human Rights Watch estimates 60,000 people were killed between 2006 and 2012 as a result of the military interventions and drug cartels fighting each other for control of territory.

To determine the drug war's effect on the homicide rate in the affected areas, the study compares the homicide rate in the first year after the military intervention in each affected region to the expected homicide rate for that same year had there not been an intervention.

Espinosa and Rubin conducted statistical analyses of 18 regions affected by military interventions. Those regions—designated by the name of their major city—are Tijuana, Nogales, Madera, Juárez, Pánuco, Reynosa, Bustamante, Guadalupe, Villa de Cos, Teúl, Rincón de Romos, Sinaloa, Tepic, La Piedad, Celaya, Apatzingán, Coahuyana and Acapulco.

Espinosa and Rubin used public data compiled by three well-respected sources in Mexico for their analysis:

- National Institute of Statistics and Geography, the country's national statistical agency
- Center of Research for Development, a nonprofit think tank that conducts research and proposes policy options for Mexico's economic and democratic development
- Official website of Mexican President Felipe Calderón (2006–2012)—**NOTE:** This data, no longer publicly available, was publicly accessible until the end of Calderón's term in December 2012

The duo analyzed the data to determine whether military interventions in the country's regions increased the homicide rates beyond what the expected homicide rate would have been without the interventions. For the purposes of the study, an intervention is defined as a confrontation between government forces and organized crime that resulted in three or more civilian deaths; in addition to its normal definition, civilians also could refer to drug cartel members.

Because the Mexican military operations were directed at municipalities rather than entire states, the authors defined regions of analysis to be a municipality that received the intervention as well as its neighboring municipalities.

This study is more statistically rigorous than two previous articles about drug war death rates published in *Nexos*, a leading cultural and political magazine in Mexico. Those articles, authored by Fernando Escalante Gonzalbo and José Merino, were published in [January] and [June 2011], respectively. Escalante relied on visual comparisons, while Merino used a less rigorous causal analysis to estimate the effect of the interventions.

When policymakers are faced with critical decisions, it is important they are basing their decisions on causal effects, not associations, said Espinosa. The statistical methodology used in this study will enable policymakers to compare intervened regions with other similar regions, not simply the past or national averages. Unfortunately, many studies that claim to measure causation forget the fundamental step of explicitly showing that their units are comparable—in our case, that the regions are actually similar. Our paper emphasizes the importance of such balance checks, explained Espinosa.

Study findings suggest military interventions resulted in an average increase of nearly 11 homicides per 100,000 inhabitants across the 18 affected regions studied. However, the estimated effects vary considerably across these regions.

"The results of our study suggest that military interventions in the Mexican drug war increased homicide rates in the short term, especially in the Juárez region," said Espinosa. "While the effect on short-term homicide rates is only one factor Mexican policymakers must account for when deciding whether and where to send troops, measuring the effect accurately should increase their ability to find the optimal tradeoff between short-term violence and long-term objectives."

Of the 18 affected regions, only Rincón de Romos and Apatzingán experienced a significant reduction in the homicide rate relative to what would have been expected without the military intervention.

Conversely, the Juárez region experienced an increase in its homicide rate that is estimated to be more than twice as large as that of any other region in the study. This finding should not be surprising. Since the 1990s, Ciudad Juárez has been notorious for displays of violence, such as more than 1,000 unsolved murders of young women between 1993 and 2003, and for being a major center of narcotics trafficking linked to the Juárez Cartel.

Removing the Juárez region, the analysis still yields a significant increase in the homicide rate. Specifically, the estimated regional average intervention effects with and without Juárez are 11.0 and 6.5, respectively. (See the following table for results for all regions.)

Estimated Intervention Effects on Homicide Rates in Affected Regions during Early Mexican Drug War

Region	Number Of Municipalities	Date Of First Intervention	Net Increase In Homicide Rate (Per 100,000 Inhabitants)	95% Interval
Juárez	16	2008	86.53	(71.4, 103.7)
Tepic	11	2010	42.92	(39.0, 46.2)
Tijuana	4	2008	33.34	(26.3, 41.0)
Nogales	6	2008	23.63	(17.4, 36.7)
Acapulco	36	2008	16.20	(5.5, 22.9)
Coahuayana	6	2010	14.94	(-2.0, 21.9)
Sinaloa	28	2007	12.19	(6.8, 19.3)
Guadalupe	20	2009	4.77	(-5.8, 11.3)
Celaya	9	2009	3.33	(0.5, 6.4)
La Piedad	9	2010	3.13	(-5.1, 11.5)
Villa de Cos	22	2008	0.09	(-2.8, 2.9)
Reynosa	24	2008	-0.68	(-4.5, 3.1)
Teúl	10	2009	-1.05	(-4.7, 1.8)
Pánuco	14	2007	-1.71	(-3.7, 0.1)
Rincón de Romos	7	2008	-3.08	(-6.7, -0.2)
Bustamante	5	2010	-5.50	(-74.6, 24.9)
Madera	12	2010	-10.60	(-45.9, 17.7)
Apatzingán	9	2007	-21.13	(-25.7, -15.7)
Avg. of Regions	------	------	10.97	(6.24, 14.27)

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Note to Reporters and Editors: Click here to access the research article. Please call or email Jeff Myers at Jeffrey@amstat.org with "Mexican Drug War" in the subject line to request an interview with the study authors.

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