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**Sustainability at its Worst: Crime and
Chronic Illegal Behavior Settings**

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**TWO KINDS OF SUSTAINABILITY
(RE: CRIME ANALYSIS)**

- Sustainability of criminogenic environments
 - I.e. “hotspots”
- Sustainability of methods for analyzing crime and crime patterns.
 - I.e., “hotspot mapping”

Both affect strategies for allocations of resources.

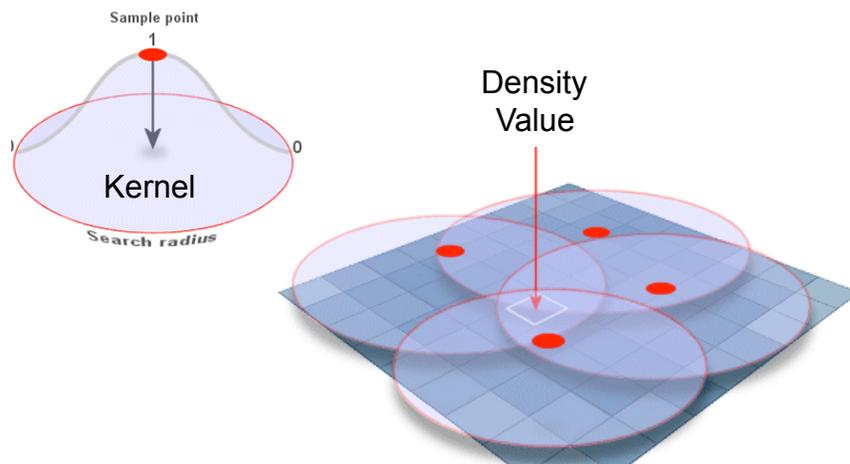
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LOCATION MATTERS



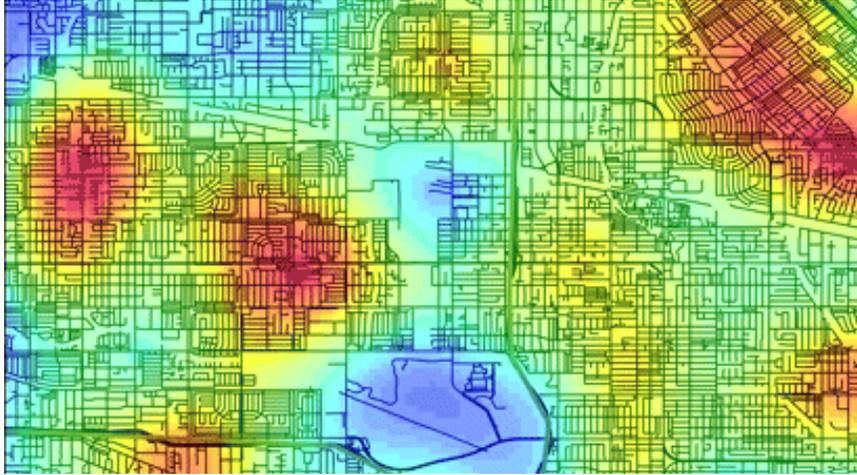
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LOCATION MATTERS: CRIME HOTSPOTS



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CRIME HOTSPOTS: CRIMINOGENIC ENVIRONMENTS



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SUSTAINABILITY, CRIMINOGENIC ENVIRONMENTS



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SUSTAINABILITY, ANALYTICAL TECHNIQUES

- Analytical techniques shouldn't be "hooked" on inputs which are outcomes intended to be prevented.



"MAPLESS MAP"

"A mapless map...describes how one variable is distributed in space.... To determine 'why' it is distributed the way it is, the spatial distribution of at least one other variable needs to be considered." (Rengert & Lockwood, 2010; p. 109)

Hotspot

THE WHAT & WHY

- Hotspots tell where to go, but not what to do when you get there.
- Q: What attracts illegal behavior at this high-crime area
- Q: Why does crime cluster there over time?

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Kid Cluster

Crime Cluster

RTM

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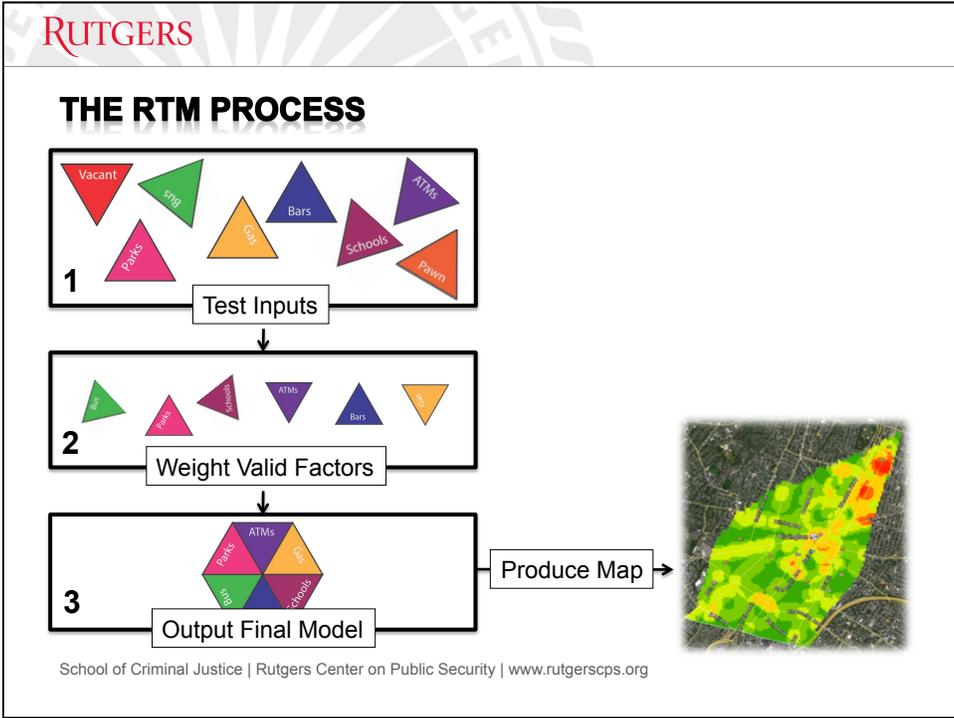
RISK TERRAIN MODELING (RTM)

- Spatial analysis technique developed by Joel M. Caplan and Leslie W. Kennedy at Rutgers University.



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STATISTICS OF THE RTMD_x UTILITY

1. Elastic net penalized regression (assuming Poisson distribution)
 - Uses cross-validation
2. Bidirectional stepwise regression
 - Bayesian Information Criteria (BIC) scores
 - Does it twice: Assumes both a Poisson and Negative Binomial distribution
3. “Best” model with lowest BIC score is selected
4. Relative Risk Value
 - Rescaling factor coefficients between the min and max values
 - Interpreted as weights of risk factors

See the User Manual at www.rutgerscps.org/software for details

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GUN VIOLENCE IN NEWARK, NJ

"Best" Model Specification

The RTMDx Utility determined that the best risk terrain model was a **Negative Binomial type II** model with **11** risk factors and a **BIC** score of **8281**. The model also includes an intercept term that represents the background rate of events and an intercept term that represents overdispersion of the event counts:

Name	Operationalization	Spatial Influence	Coefficient	Relative Risk Value
NarcoticsArrests2012 StreetLevel	Density	226	1.2616	3.5311
Newark Foreclosure	Proximity	904	1.2114	3.3582
Newark Restaurants Sitdown	Proximity	1356	1.0137	2.7558
Newark gas stations	Proximity	226	0.9321	2.5399
Newark convenience stores	Proximity	226	0.8411	2.3190
Newark Foods carryout	Proximity	226	0.7855	2.1934
LiquorEstab2013 Bars	Proximity	226	0.7001	2.0140
AbandonProp2013 OnlyCertain	Proximity	1356	0.3597	1.4328
Newark Schools 2013	Proximity	1356	0.3214	1.3791
LiquorEstab2013 LiquorStores	Proximity	1356	0.2933	1.3408
AtRisk Housing 2013 Points	Proximity	452	0.2904	1.3370

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MITIGATE SPATIAL RISK FACTORS

Vacant Property → Community Garden



Downloaded from injuryprevention.bmj.com on March 11, 2014 - Published by group.bmj.com

Original article



Greening vacant lots to reduce violent crime: a randomised controlled trial

Eugenia C Garvin,¹ Carolyn C Cannuscio,² Charles C Branas³

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STRATEGIC EXAMPLE OF RTM

Risk-Based Interventions



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CRIME PREDICTION



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RESULTS

Table 1: Risk Terrain Model Results of Attractors and Generators of Robbery in Kansas City, Chicago, and Newark

Kansas City				Chicago				Newark			
Factor	SO	SI	RR	Factor	SO	SI	RR	Factor	SO	SI	RR
Bus Stops	D	1155	5.77	Foreclosures	P	1065	4.79	Foreclosures	P	1356	8.95
Drug Markets	D	924	3.01	Bus Stops	P	213	3.80	Bus Stops	D	226	1.26
Gas Stations	D	462	2.24	Liquor Stores	P	213	2.77	Laundromats	D	226	0.99
Liquor Stores	P	924	2.04	Drug Markets	P	852	2.32	Drug Markets	D	226	0.83
Grocery Stores	P	1386	1.80	Gas Stations	P	426	2.10	Gas Stations	D	226	0.78
Variety Stores	D	1386	1.61	Laundromats	P	213	1.98	Schools	P	1356	0.48
Foreclosures	P	1386	1.56	Variety Stores	D	639	1.80	Parking Garages	P	678	0.42
Bars	D	1386	1.42	Bars	P	213	1.80	Liquor Stores	P	1356	0.40
				Grocery Stores	P	1065	1.64	Bars	P	678	0.40
				Parking Garages	D	852	1.53	Grocery Stores	P	904	0.38
				Schools	P	1278	1.36				

Factor: Attractor/Generator of Crime
 SO: Optimal Spatial Operationalization
 SI: Optimal Spatial Influence
 RR: Relative Risk Value

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CONCLUSION

- Sustainable environments for crime exist.
- Characteristics of these environments may differ for different crime types and different jurisdictions.
- What does this mean for research?
- What does this mean for practice?

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CONCLUSION

Joint Utility of Event-Dependent and Environmental Crime Analysis Techniques for Violent Crime Forecasting

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