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# A State Census of Unsubmitted Sexual Assault Kits: Comparing Outcomes by Geography and Population Density

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**PAPER**

**CRIMINALISTICS**

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A State Census of Unsubmitted Sexual  
Assault Kits: Comparing Forensic DNA Testing  
Outcomes by Geographic and Population  
Density Characteristics\*

# RESEARCH ON UNSUBMITTED SAKs

# National Landscape Studies

Scope of the Problem

# Site-Specific Studies

Inventory, Root Causes, Forensic Testing Outcomes

# National Landscape Studies

## Scope of the Problem

### Lovrich et al. (2004)

Survey of 1,692 LEAs  
Estimated number of  
unsolved cases with  
unsubmitted evidence

### Strom & Hickman (2010)

Survey of 2,250 LEAs  
Estimated number of  
unsolved cases with  
unsubmitted evidence

### Strom et al. (in press)

Statistical modeling  
based on actual counts  
of unsubmitted SAKs in  
911 counties

## KEY FINDINGS

Estimation methods are often used because it is *really* hard to get a true national count of unsubmitted SAKs

Definitions are critical so LEAs are estimating/counting the same way

Current best empirical estimate: 300,000 – 400,000 unsubmitted SAKs

# Site-Specific Studies

Inventory, Root Causes, Forensic Testing Results



# Site-Specific Studies

Inventory, Root Causes, Forensic Testing Results

<b>LOS ANGELES</b> (Peterson et al., 2012)	<b>DETROIT</b> (Campbell et al., 2015)	<b>HOUSTON</b> (Wells et al., 2016)	<b>CLEVELAND</b> (Lovell et al., 2017)
Census: 10,895 SAKs	Census: 11,313 SAKs	Census: 6,663 SAKs	Census: 4,966 SAKs
Test Sample: 1,320 SAKs	Test Sample: 1,595 SAKs	Test Sample: 493 SAKs	Test Sample: 433 SAKs

## KEY FINDINGS

Evidence in unsubmitted SAKs still viable for forensic DNA testing

Approximately 50% of kits tested yield a DNA profile eligible for upload to CODIS. Of those uploaded profiles, approximately 50% yield a CODIS hit (the “half and half” effect)

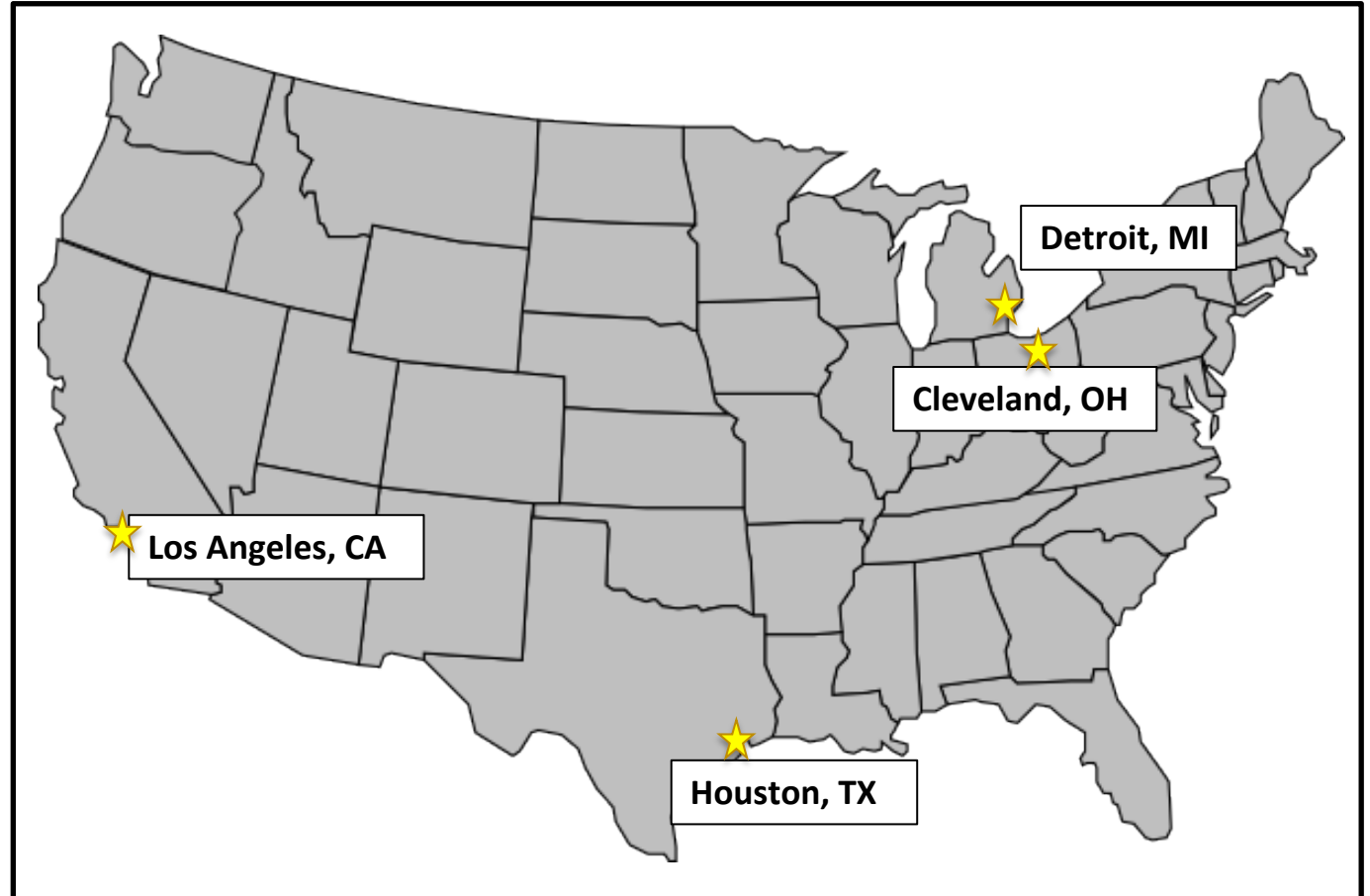
Testing yields a substantial number of CODIS hits

Strong empirical evidence to support recommendations to test all SAKS



# Site-Specific Studies

Inventory, Root Causes, Forensic Testing Results



Um . . . what do these sites have in common?

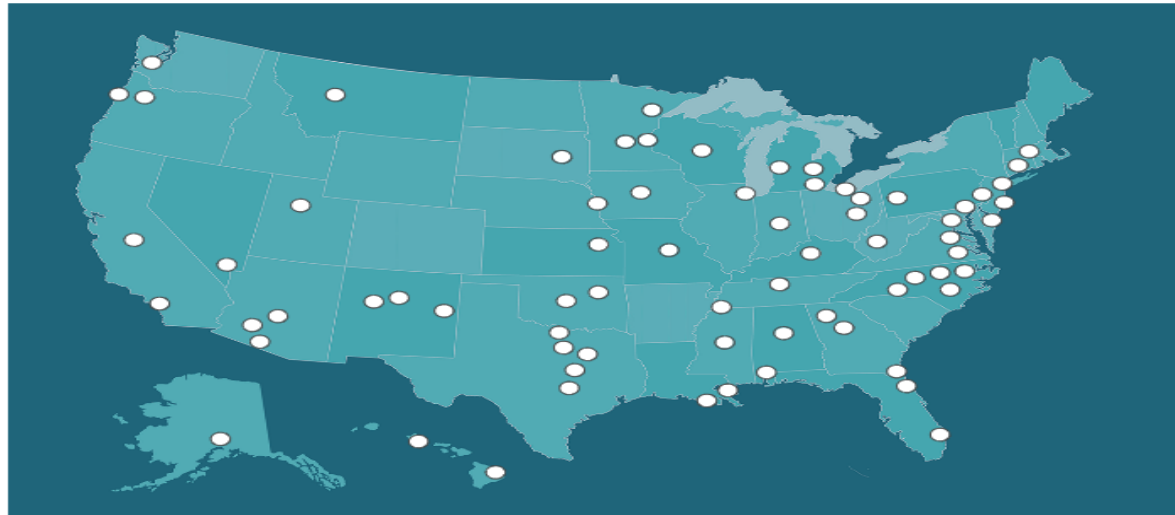
Um . . . what did the national landscape studies show?

This is a National Problem

That Is Easier to Study at the Site Level

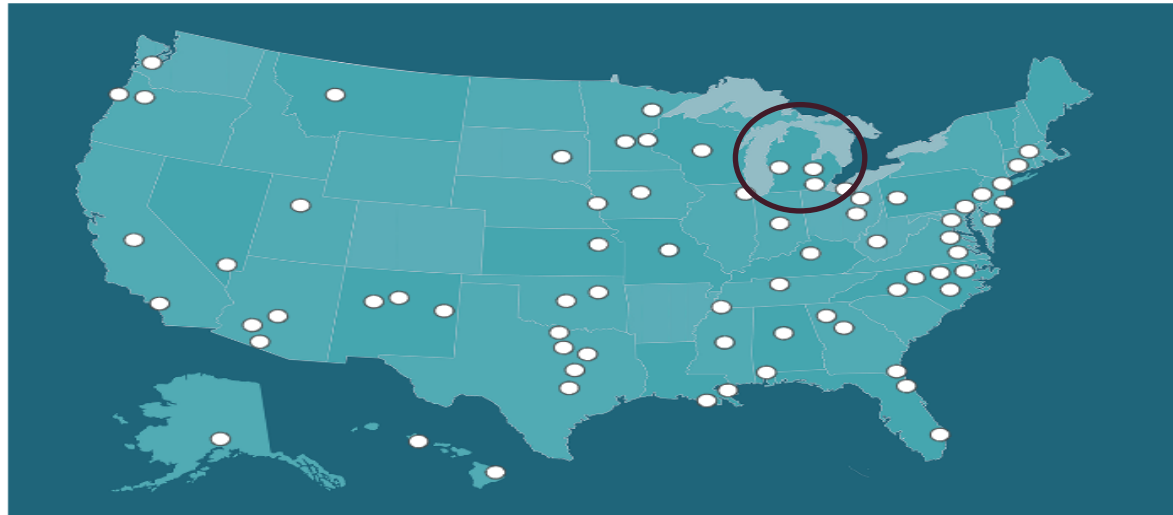
## SAKI Grantee Sites

*Explore the map below to learn about the National Sexual Assault Kit Initiative (SAKI) grantees and their progress. SAKI sites are distributed throughout the United States. This map highlights the 71 SAKI grantees that have received funding over the last 6 years. SAKI sites, both currently and previously funded, represent approximately 57% of the U.S. population (328.2 million). In 2015, 20 state and local jurisdictions were funded as the initial SAKI sites; the Bureau of Justice Assistance funded 13 existing SAKI sites and 12 new jurisdictions in 2016, 12 existing SAKI sites and 9 new jurisdictions in 2017, 16 existing SAKI sites and 13 new jurisdictions in 2018, 19 existing SAKI sites and 10 new jurisdictions in 2019, and 28 existing SAKI sites and 7 new jurisdictions in 2020. Because the SAKI program has expanded to include multiple purpose areas, SAKI grantees have been able to receive additional funding to expand their SAKI programs to include these additional areas of focus, such as lawfully owed DNA, to create a comprehensive response to sexual assault. Each SAKI site has its own webpage linked below with additional information about the site and how SAKI funds are being used.*



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Michigan State Police

SAKI 2015  
Statewide Site

# MICHIGAN SAKI PROJECT

2015 Statewide SAKI Site



# Michigan State Police SAKI Project

## Multidisciplinary Team

Michigan State Police

Michigan State Police Forensic Science Division

Prosecuting Attorney's Association of Michigan

State Attorney General's Office

Michigan DHHS Division of Victim Services

Local Law Enforcement, Prosecutors, Advocates

Michigan State University Researchers

## Scope & Purpose

Inventory of all previously unsubmitted SAKs in the state (to March 1, 2015)

EXCLUDING City of Detroit, City of Flint

INCLUDING Wayne County & Genesee County

Test ALL inventoried SAKs (outsourced)

Work with MSU Research Team to study forensic testing outcomes

→ "Under the terms of the grant, all unsubmitted kits must be accounted for and audited regardless of the reason why the kits were not previously submitted. For example, the following kits must be included in your inventory: kits where the complainant has refused to prosecute; kits believed to be beyond the statute of limitations; kits where a determination has been made that the charges are unfounded; and kits where the underlying case was adjudicated by trial or plea."



# 83 Counties



58 counties had unsubmitted SAKs  
25 counties reported no unsubmitted SAKs



**N = 3,422 SAKs in inventory**



1% collected between 1980 and 1989

9% collected between 1990 to 1999

40% collected between 2000 to 2009

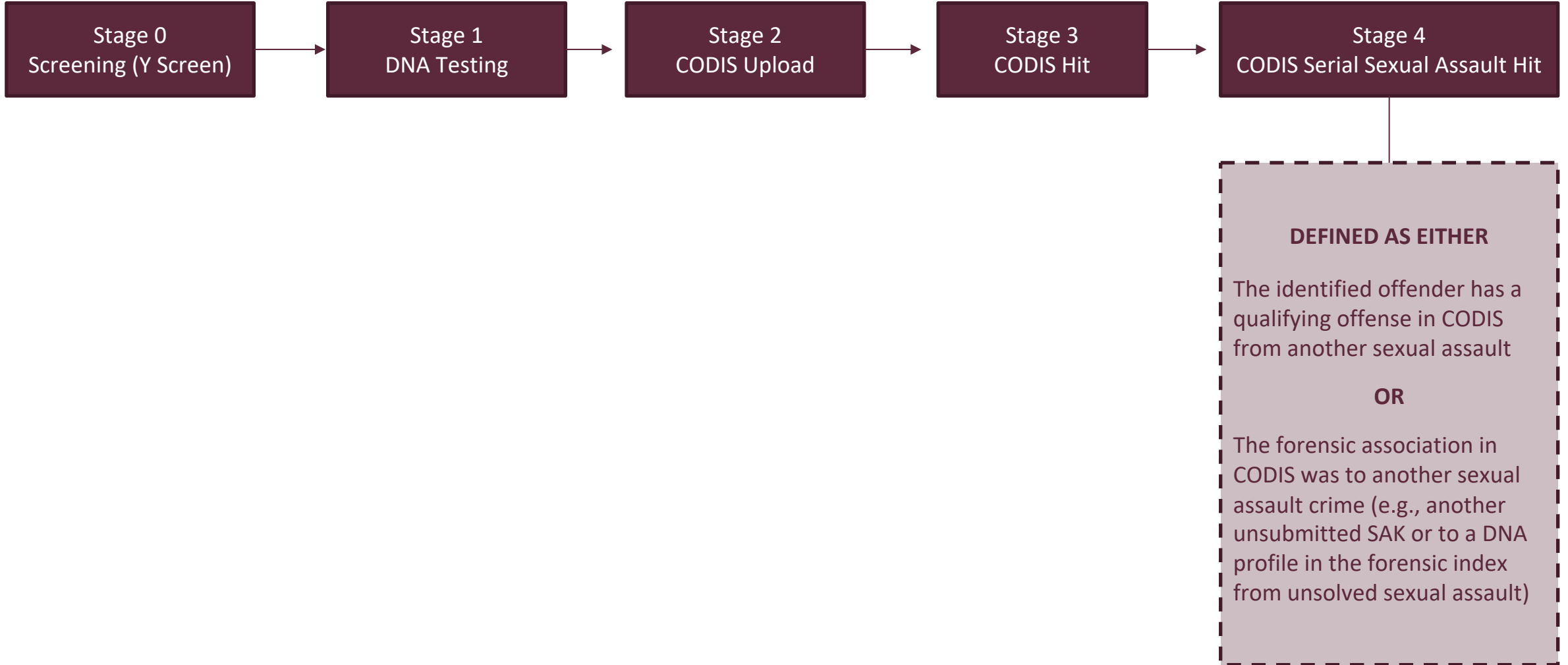
50% collected between 2010 to close date of census

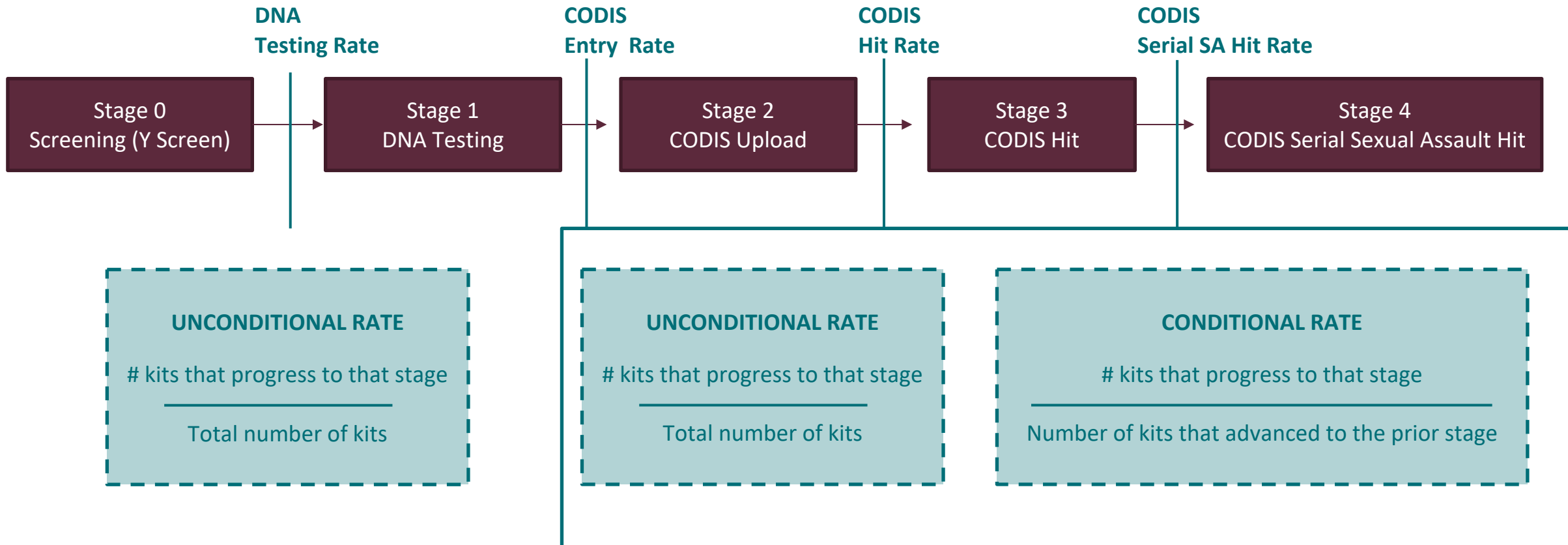
# RESEARCH QUESTION 1

What Are the Obtained Forensic Testing Rates in the Overall Sample?

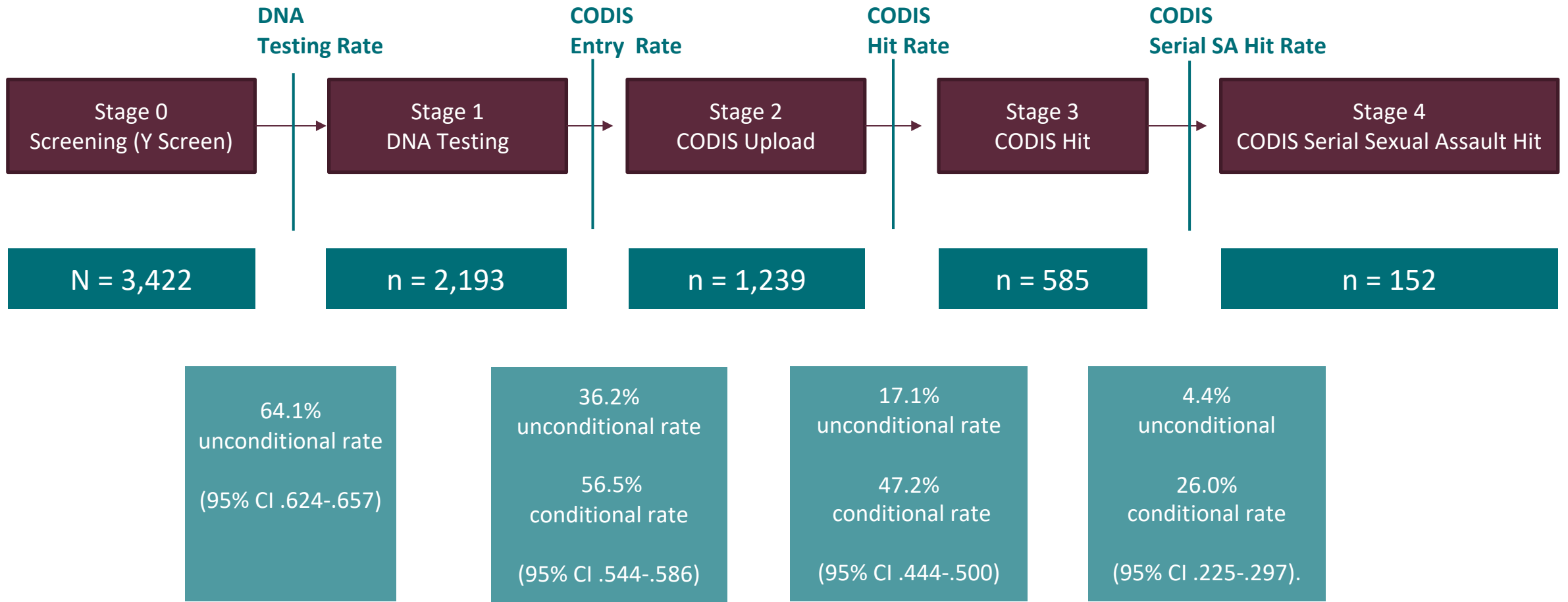
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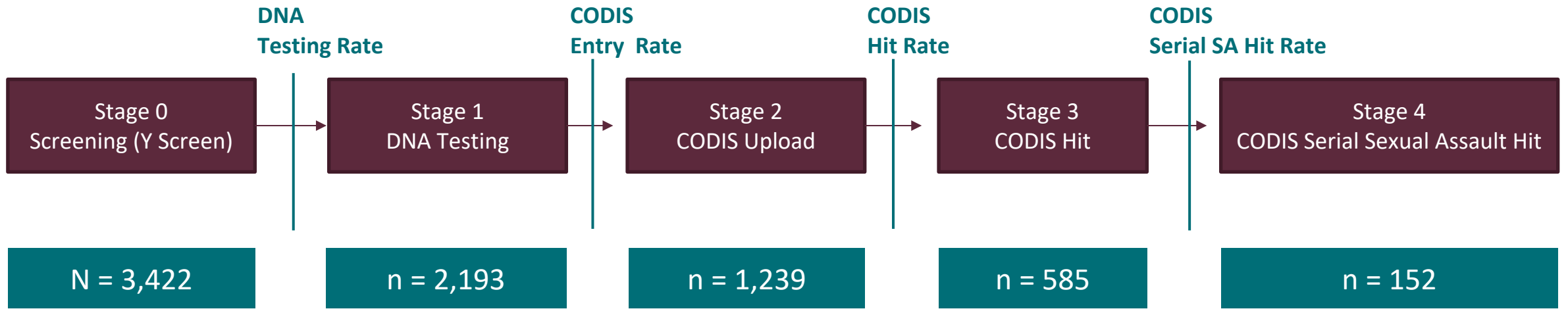






*REPORT EITHER/BOTH, JUST BE CLEAR!!!*





64.1%  
unconditional rate  
(95% CI .624-.657)

36.2%  
unconditional rate  
56.5%  
conditional rate  
(95% CI .544-.586)

17.1%  
unconditional rate  
47.2%  
conditional rate  
(95% CI .444-.500)

4.4%  
unconditional  
26.0%  
conditional rate  
(95% CI .225-.297).

The "Half and Half" Effect Replicated in Statewide Sample

# RESEARCH QUESTION 2

How Do Forensic Testing Rates Compare by Geographic and Population Density Characteristics?

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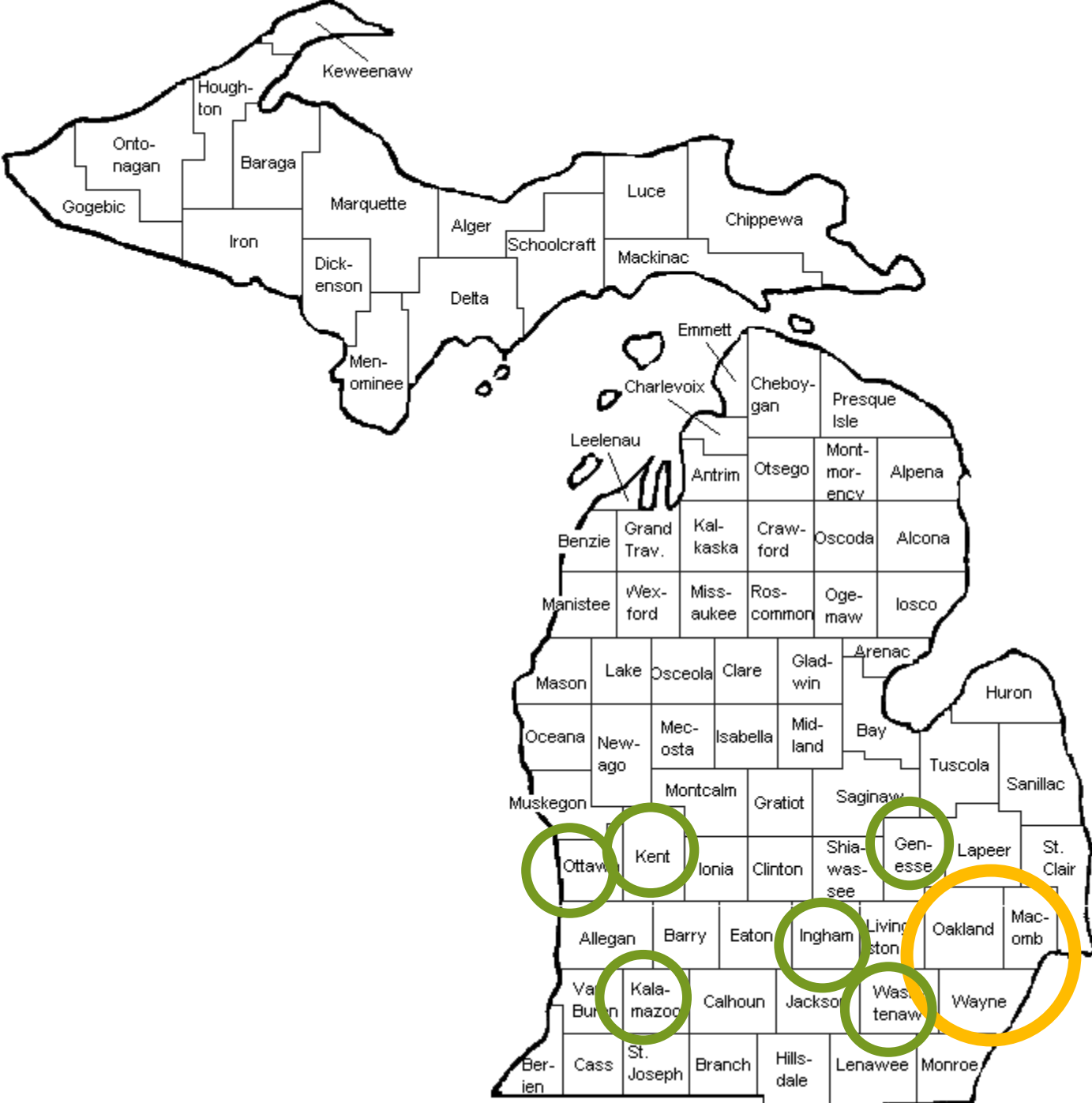


Michigan has considerable geographic diversity and population density variability

Michigan has considerable geographic diversity and population density variability

**Detroit Tri-County Area**



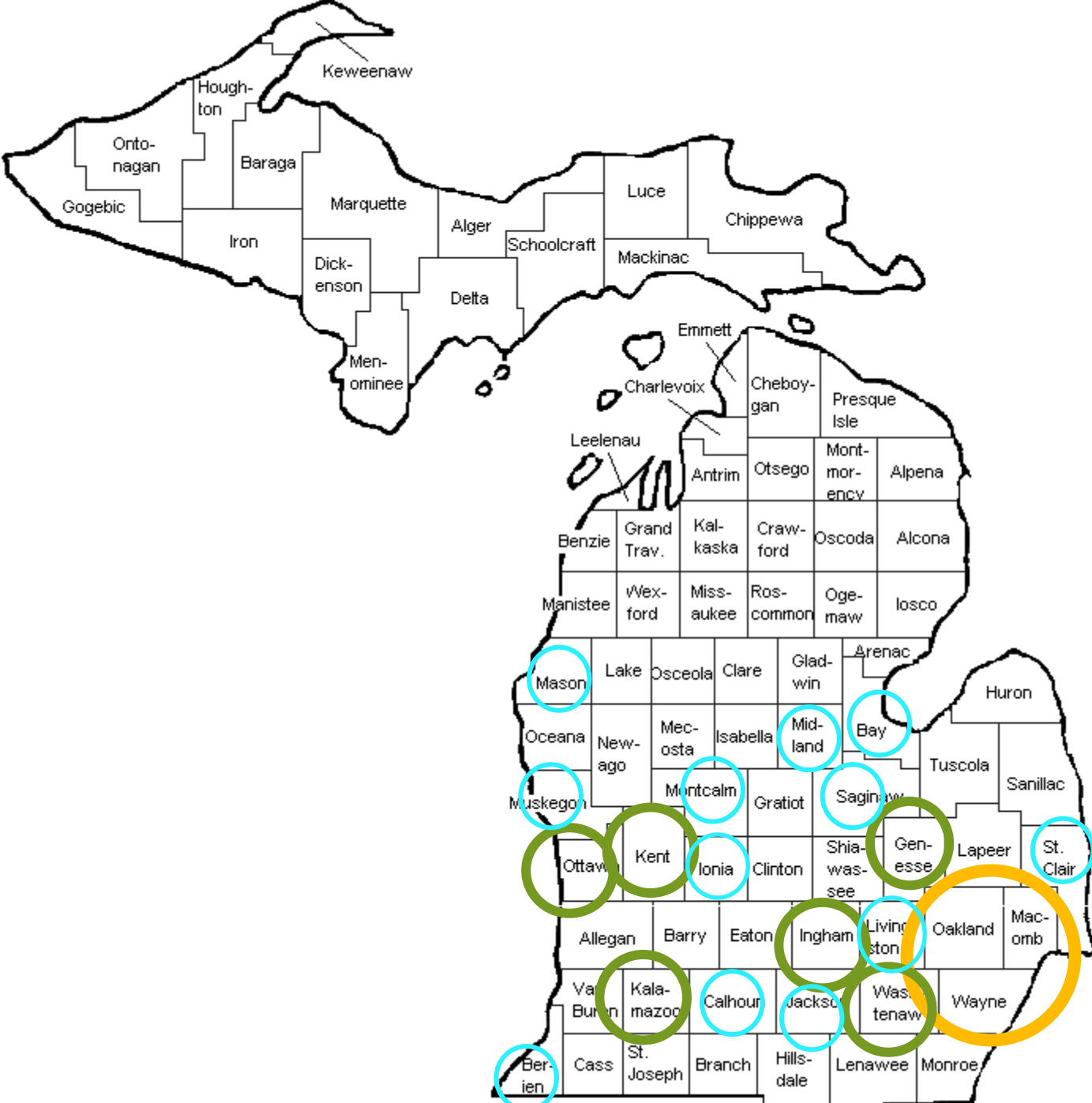


Michigan has considerable geographic diversity and population density variability

**Detroit Tri-County Area**

**Several other large cities**



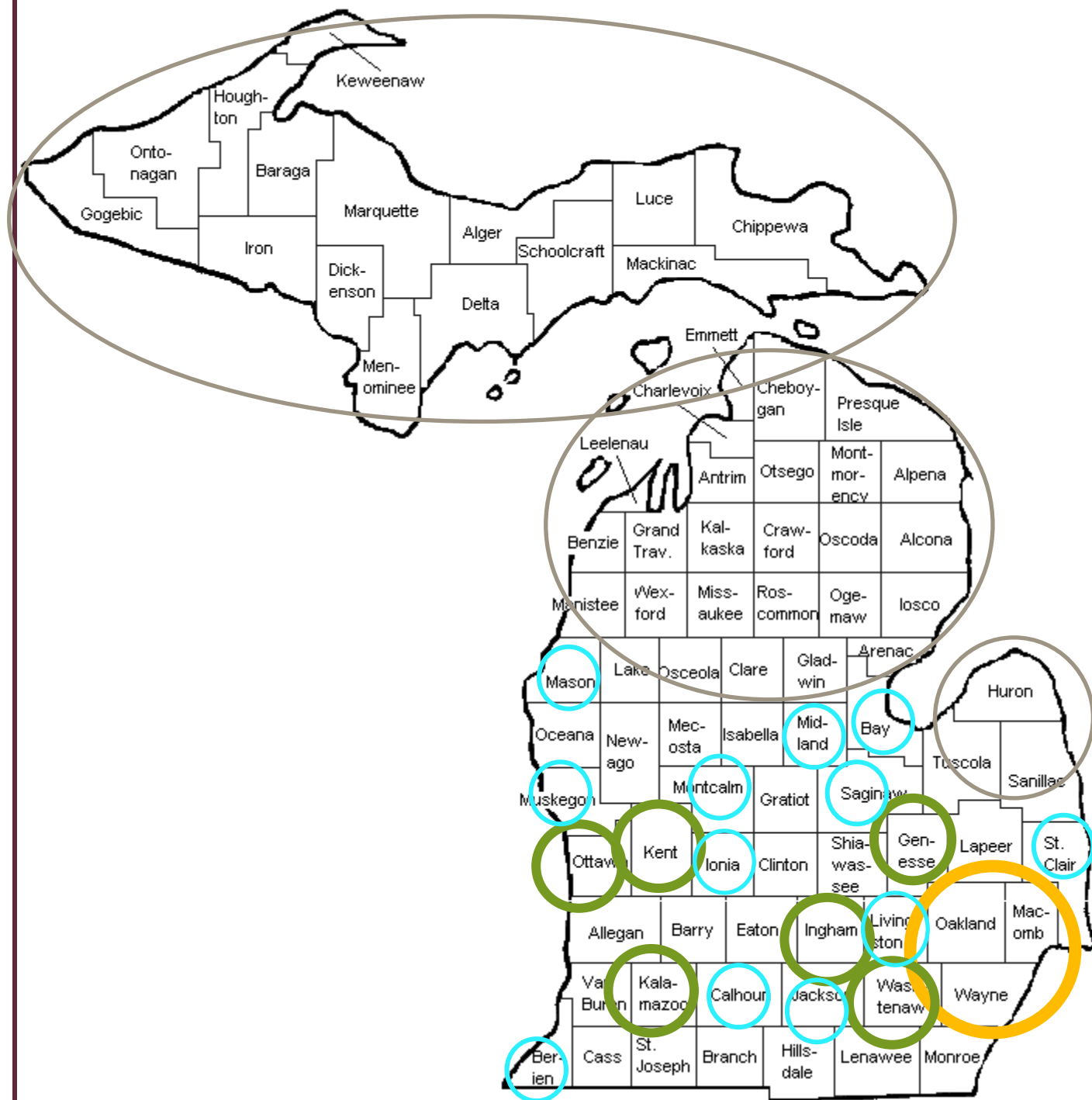


Michigan has considerable geographic diversity and population density variability

**Detroit Tri-County Area**

**Several other large cities**

Many areas with one medium-sized city in rural county



Michigan has considerable geographic diversity and population density variability

**Detroit Tri-County Area**

**Several other large cities**

Many areas with one medium-sized city in rural county

LOTS of rural counties



## OMB DEFINITIONS

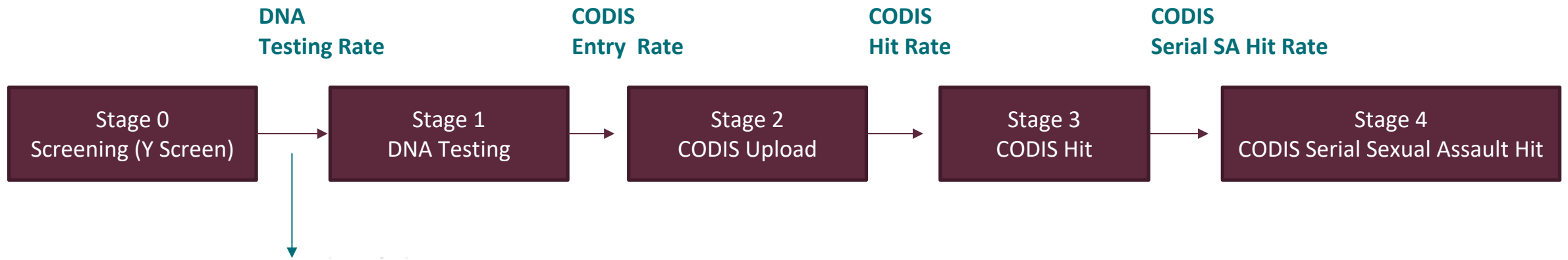
Metropolitan = counties with at least one urban area with a population >50,000 people

Micropolitan = counties that have one or more urban clusters between 10,000 – 50,000 people

Many metropolitan counties, so subdivided based on population density per 2010



Category 1	Metropolitan counties with population density over 1,000 people per square mile	3 counties
Category 2	Metropolitan counties with population density of 400 – 1,000 people per square mile	6 counties
Category 3	Metropolitan counties with population density of less than 400 people per square mile	17 counties
Category 4	Micropolitan counties with population density of 400 – 1,000 people per square mile	19 counties
Category 5	Counties with no metropolitan or micropolitan areas	13 counties

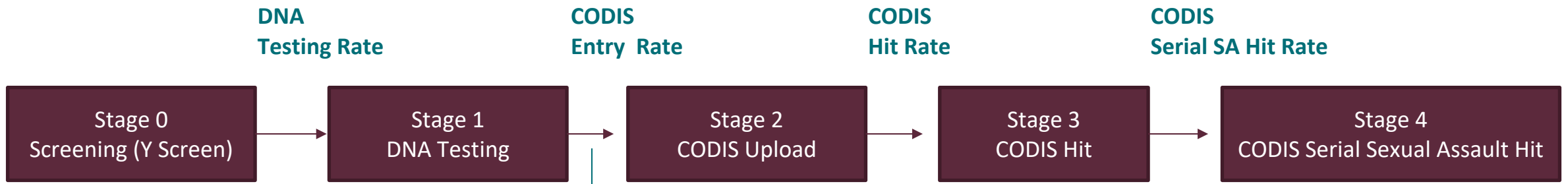


Unconditional DNA Testing Rates

Category	DNA Test = 0 (no)		DNA Test = 1 (yes)		Pairwise Differences*
	Frequency	Proportion	Frequency	Proportion	
1	483	0.36	846	0.64	1 vs. 5 ( $p = 0.028$ )
2	358	0.35	673	0.65	2 vs. 5 ( $p = 0.015$ )
3	307	0.36	551	0.64	3 vs. 5 ( $p = 0.024$ )
4	56	0.36	101	0.64	4 vs. 5 ( $p = 0.047$ )
5	25	0.53	22	0.47	

Rates quite similar in Categories 1-4

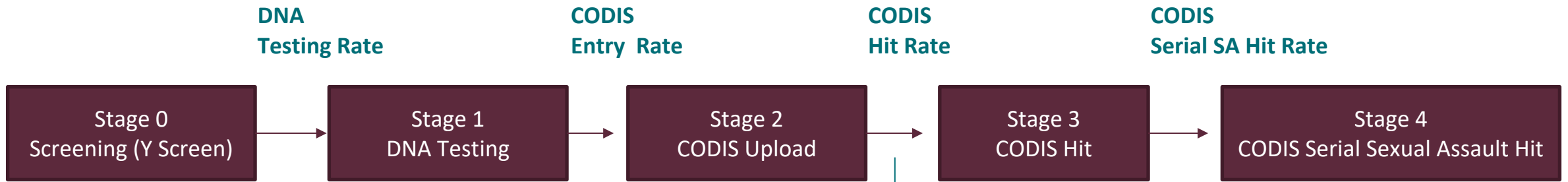
Rates were significantly higher for Categories 1-4 compared to Category 5



Conditional CODIS Eligibility Rates

Category	CODIS Eligible = 0 (no)		CODIS Eligible = 1 (yes)		Pairwise Differences
	Frequency	Proportion	Frequency	Proportion	
1	335	0.40	511	0.60	1 vs. 2 ( $p = 0.018$ ) 1 vs. 3 ( $p = 0.032$ ) 1 vs. 4 ( $p = 0.029$ )
2	308	0.46	365	0.54	
3	251	0.46	300	0.54	
4	52	0.52	49	0.49	
5	8	0.36	14	0.64	

Rates highest in Category 1  
 Category 1 significantly different from  
 Categories 2, 3, 4  
 Category 5 also had high rates

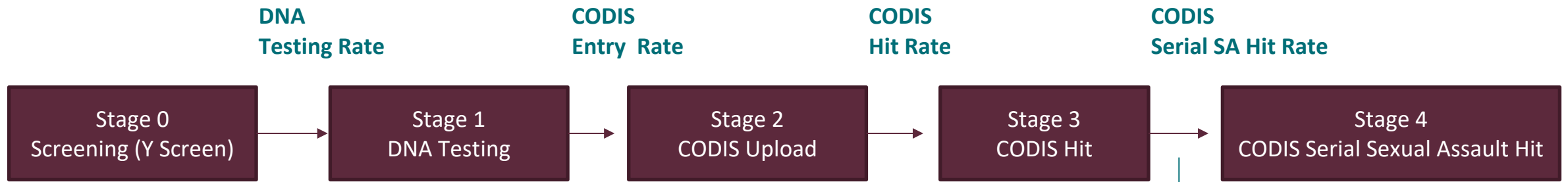


Conditional CODIS Hit Rates

Category	CODIS Hit = 0 (no)		CODIS Hit = 1 (yes)		Pairwise Differences
	Frequency	Proportion	Frequency	Proportion	
1	275	0.54	236	0.46	2 vs. 3 ( $p = 0.048$ )
2	174	0.48	191	0.52	
3	167	0.56	133	0.44	
4	29	0.59	20	0.41	
5	9	0.64	5	0.36	

Rates range across Categories  
(~one-third to ~one-half)

Category 2 significantly higher  
than Category 3

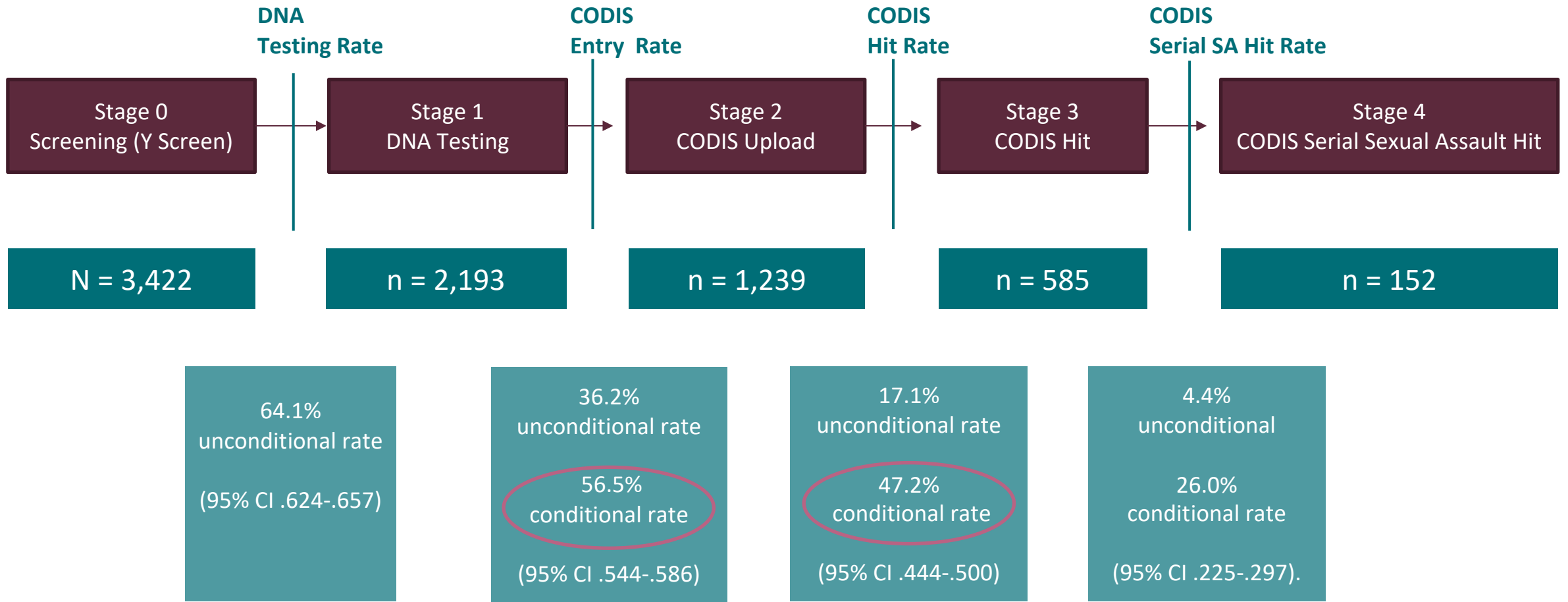


Conditional CODIS Serial Sexual Assault (SA) Hit Rates

Category	Serial SA Hit = 0 (no)		Serial SA Hit = 1 (yes)		Pairwise Differences
	Frequency	Proportion	Frequency	Proportion	
1	142	0.60	94	0.40	1 vs. 2 ( $p < 0.001$ ) 1 vs. 3 ( $p < 0.001$ )
2	162	0.85	29	0.15	
3	107	0.81	26	0.20	
4	17	0.85	3	0.15	
5	5	1.00	0	0.00	

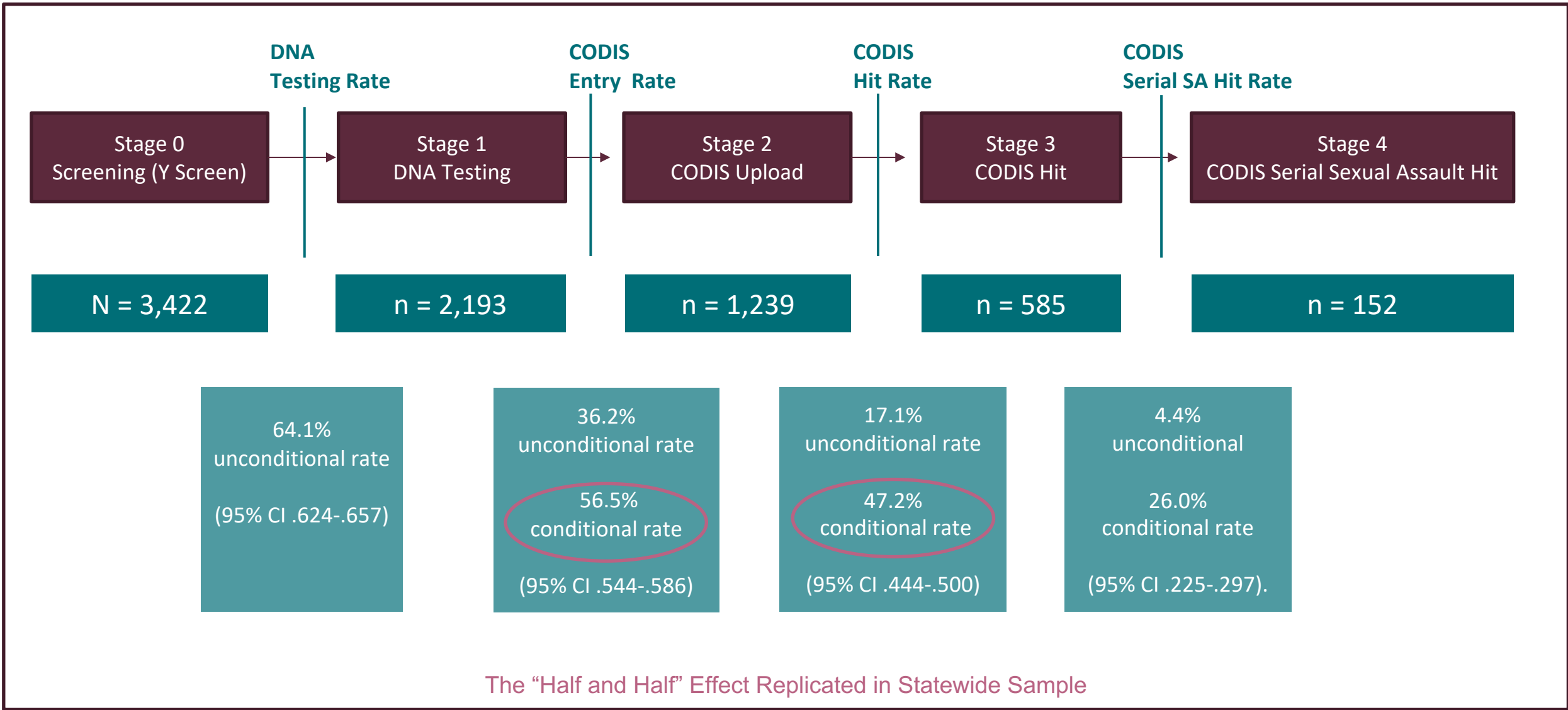
CODIS Serial Sexual Assault Hits most likely in large urban areas

Low rates in rural areas



The “Half and Half” Effect Replicated in Statewide Sample





The “Half and Half” Effect Replicated in Statewide Sample

**AND Effect Generally Replicates Within Geographic/Population Regions**

# RESEARCH QUESTION 3

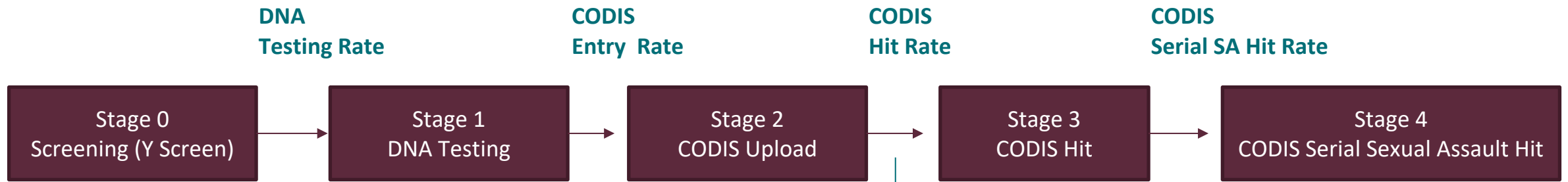
How Do Obtained Forensic Testing Rates Compare to  
Heuristic Threshold Rates?

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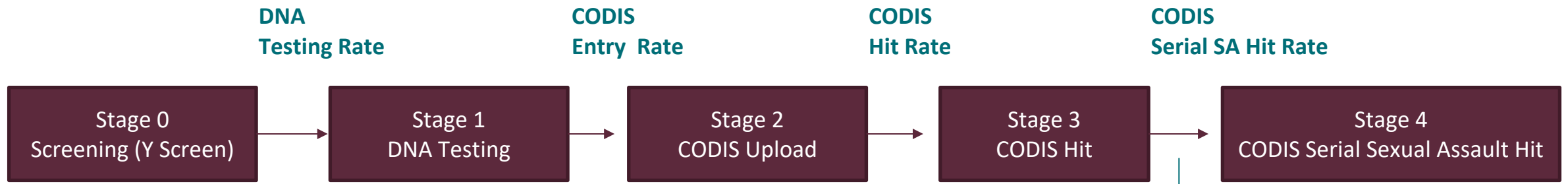
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*The process of inventorying unsubmitted kits is a considerable financial undertaking, and criminal justice system personnel may wonder whether testing these kits is truly necessary and whether it will yield results at some level and quantity that would justify the time, effort, and expense.*



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“

*At a minimum threshold,  
are testing outcome rates significantly greater than zero?*

*Are they greater than 33%?*

*Greater than 50%?*



*In low-density rural counties, for instance, if it is unlikely that CODIS hits would exceed the lower thresholds, stakeholders may need to consider how best to use limited laboratory resources.*

*In high-density urban counties, if CODIS hit rates may exceed the higher thresholds, police and prosecutors will need careful planning to determine how they will take on a large number of new, active cases.*

# Focus WITHIN Each Category Group

Category	Proportion	<i>p</i> -Values		
		Proportion > 0	Proportion > 0.33	Proportion > 0.5
<b>Unconditional DNA Testing Rates</b>				
1	0.64	<0.001	<0.001	<0.001
2	0.65	<0.001	<0.001	<0.001
3	0.64	<0.001	<0.001	<0.001
4	0.64	<0.001	<0.001	<0.001
5	0.47	<0.001	0.034	0.720
<b>Conditional CODIS Eligibility Rates</b>				
1	0.60	<0.001	<0.001	<0.001
2	0.55	<0.001	<0.001	0.003
3	0.52	<0.001	<0.001	0.173
4	0.53	<0.001	<0.001	0.309
5	0.56	<0.001	0.001	0.244
<b>Conditional CODIS Hit Rates</b>				
1	0.46	<0.001	<0.001	0.962
2	0.52	<0.001	<0.001	0.201
3	0.44	<0.001	<0.001	0.978
4	0.41	<0.001	0.156	0.924
5	0.36	<0.001	0.514	0.910
<b>Conditional CODIS Serial Sexual Assault Hit Rates</b>				
1	0.40	<0.001	0.016	0.999
2	0.15	<0.001	1.000	1.000
3	0.20	<0.001	1.000	1.000
4	0.15	0.001	0.981	1.000
5	0.00	1.000	1.000	1.000

For populating CODIS → YES, SAK testing worthwhile  
 Rates higher than zero, higher than .33, and in larger cites, higher than .50



# Focus WITHIN Each Category Group

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5	0.00	1.000	1.000	1.000

For informing sexual assault investigation → YES, SAK testing worthwhile  
 Rates higher than zero, higher than .33 in metropolitan areas

# Focus WITHIN Each Category Group

Category	Proportion	<i>p</i> -Values		
		Proportion > 0	Proportion > 0.33	Proportion > 0.5
<b>Unconditional DNA Testing Rates</b>				
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5	0.00	1.000	1.000	1.000

For finding suspected serial sexual offenders → YES, in large urban areas

# CONCLUSIONS & DISCUSSION



# Final Thoughts . . .

- Statewide SAKI sites provide an opportunity to study the role of geographic & population characteristics
- Even with the exclusion of two large cities (with high crime rates), we still found strong yield rates for CODIS eligible profiles and CODIS hits
- The statewide results are NOT due to larger cities “pulling up” the results because the forensic testing outcomes are generally consistent across geographic and population density groupings
- These findings emphasize the importance of SAK testing in smaller and rural communities
- CODIS serial sexual assault hits are primarily in urban areas, BUT even in communities of 10K-50K people, one in five CODIS hits revealed suspected serial sexual offenders
- We acknowledge that we do not know how LEAs utilized these CODIS hits and how they were useful to investigations
- We look forward to seeing how our findings compare to other statewide SAKI sites

# Contact Information



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