

Impact of **Pregnancy** Status on the Association Between Methamphetamine Use and Syphilis Treatment in Los Angeles County

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Presenter Disclosures

There are no personal relationship with commercial interests relevant to this presentation to disclose.

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Acronyms

PRP

Persons of
Reproductive
Potential, Assigned
female at birth and
aged 15-44 years

CS

Congenital Syphilis

Meth

Methamphetamine

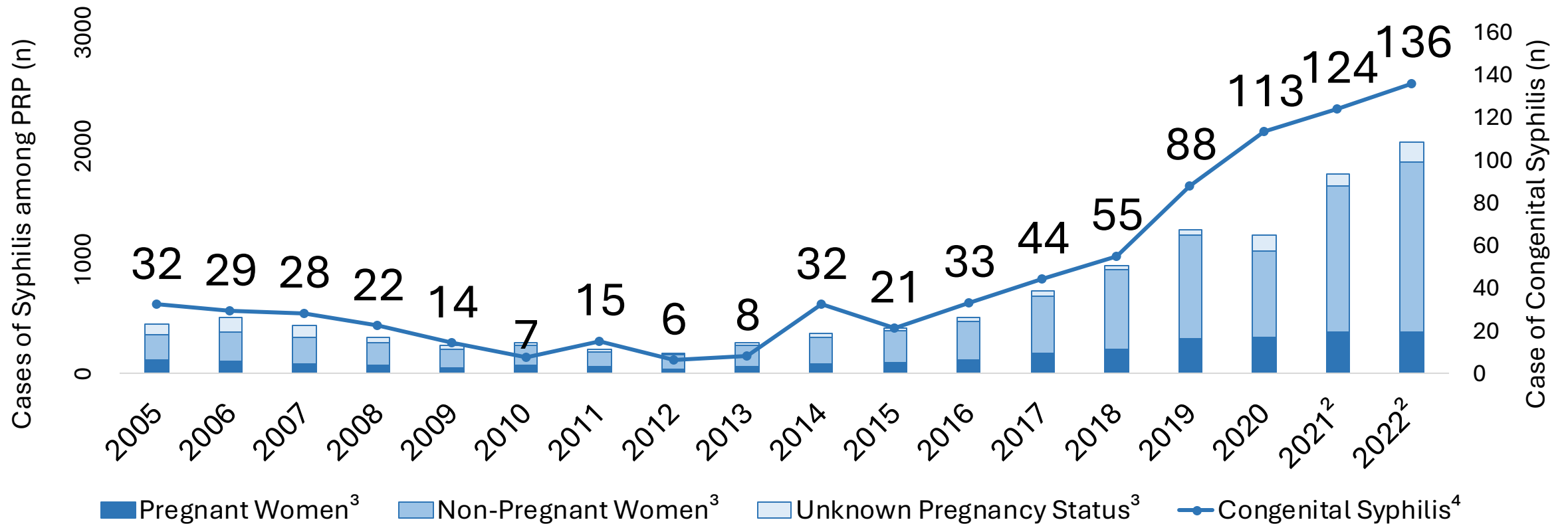
Agenda

1. Syphilis in Los Angeles County
2. Methods
3. Results
4. Discussion

1. Syphilis in Los Angeles County

Sharp Rise of CS

Number of PRP and Probable Congenital Syphilis Cases, Los Angeles County, 2005-2022¹

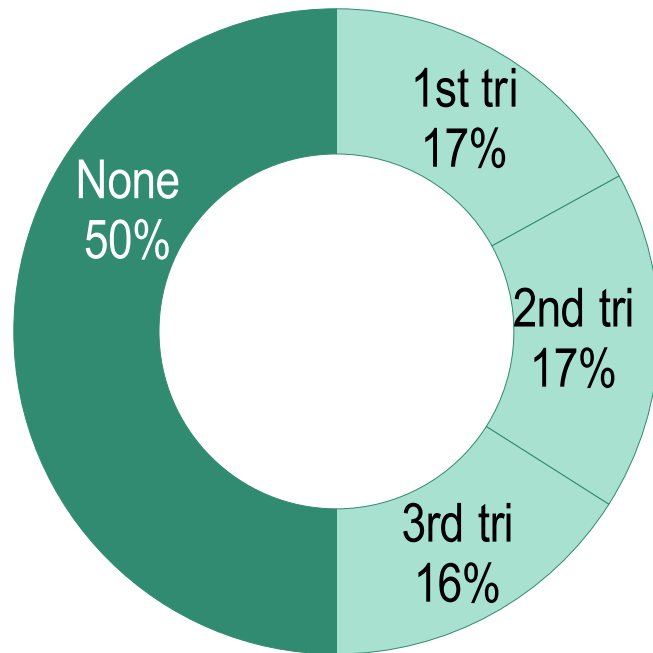


Footnote. ¹ 2005-2022 data are from STD Casewatch as of 08/20/2023 and exclude cases from Long Beach and Pasadena ² 2021-2022 data are provisional due to reporting delay. ³ Syphilis among females of childbearing age (ages 15-44) including all cases staged as primary, secondary, early non-primary non-secondary (previously early latent) and unknown duration/late (previously late latent) ⁴ Congenital Syphilis includes syphilitic stillbirths. **Data source:** Los Angeles County Department of Public Health Division of HIV and STD Programs

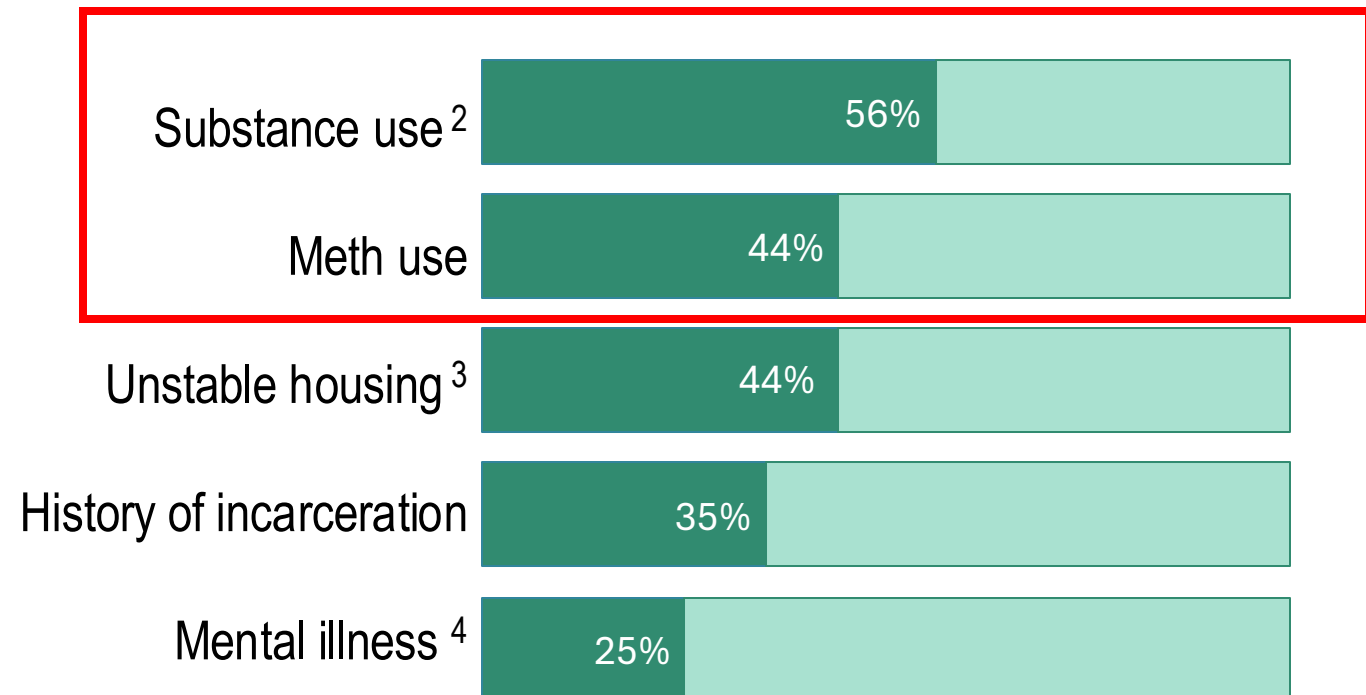


Birthing Parent Characteristics¹ of Infants Born with CS in 2022

Trimester at prenatal care entry



Health and social vulnerabilities



Footnote. ¹ Characteristics are likely under-reported due to loss to follow up and minimal medical documentation.

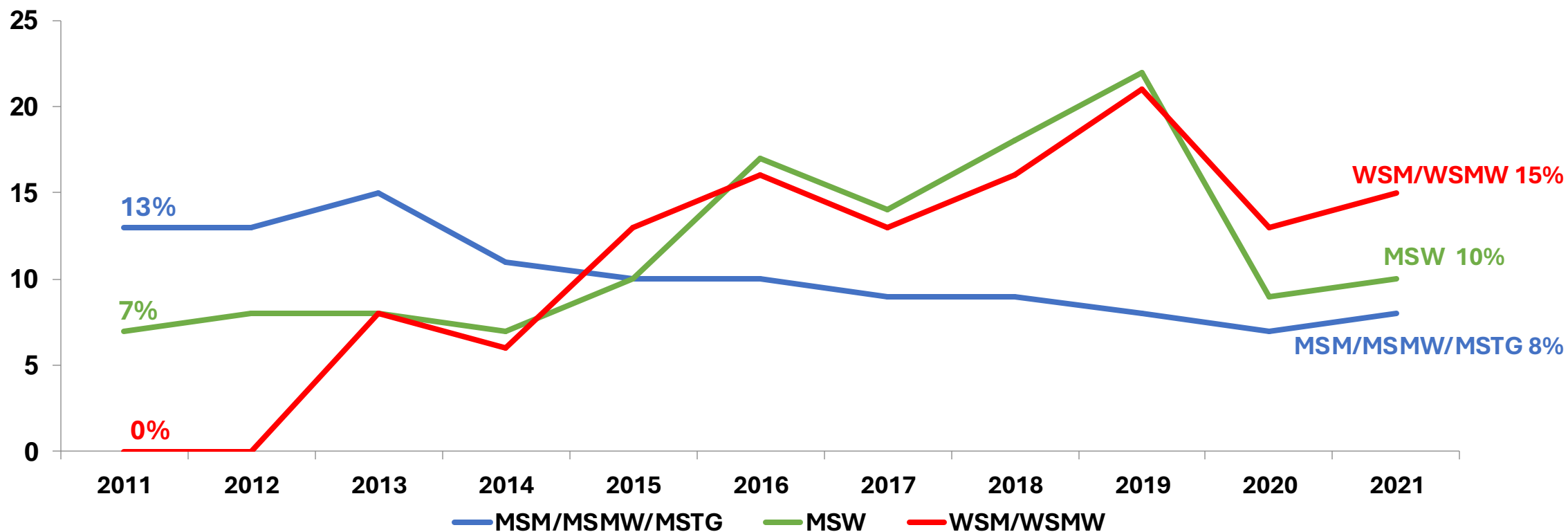
² Includes meth, excludes marijuana. ³ Includes shelters, sleeping outdoors, group homes, transitional housing, and other living arrangements ⁴

Within the last 2 years. **Data sources:** Los Angeles County Department of Public Health Division of HIV and STD Programs, toxicology reports, syphilis interviews, LA County Sheriff's Dept. Inmate, Information Center, medical records. Congenital syphilis REDCap data as of 12/18/2023.



Meth Use Among Early Syphilis Cases

by Sexual Orientation (MSM/MSMW/MSTG, MSW and WSM/WSMW)



Footnote. ¹ Early Syphilis includes Primary, Secondary and Early Latent Syphilis. Data as of 11/5/2022. ² Of 28,707 Early Syphilis incidents with a qualifying interview, 26,166 (91.1%) responded with yes/no to methamphetamine use during the past 12 months and are included in the analysis. Percent missing ranged from 6.2%-14.5%. ³ Percentage reflects the number of individuals reporting methamphetamine use in the past 12 months among those who answered yes/no to the methamphetamine question in the disease investigation interview. Other listed responses (e.g. Refused, Unknown) are excluded from the denominator.

Acronyms. MSM/MSMW/MSTG: Men who have Sex with Men/Men who have Sex with Men and Women/Men who have Sex with Transgender; MSW: Men who have Sex with Women; WSM/WSMW: Women who have Sex with Men/Women who have Sex with Men and Women. **Data source:** Los Angeles County Department of Public Health Division of HIV and STD Programs



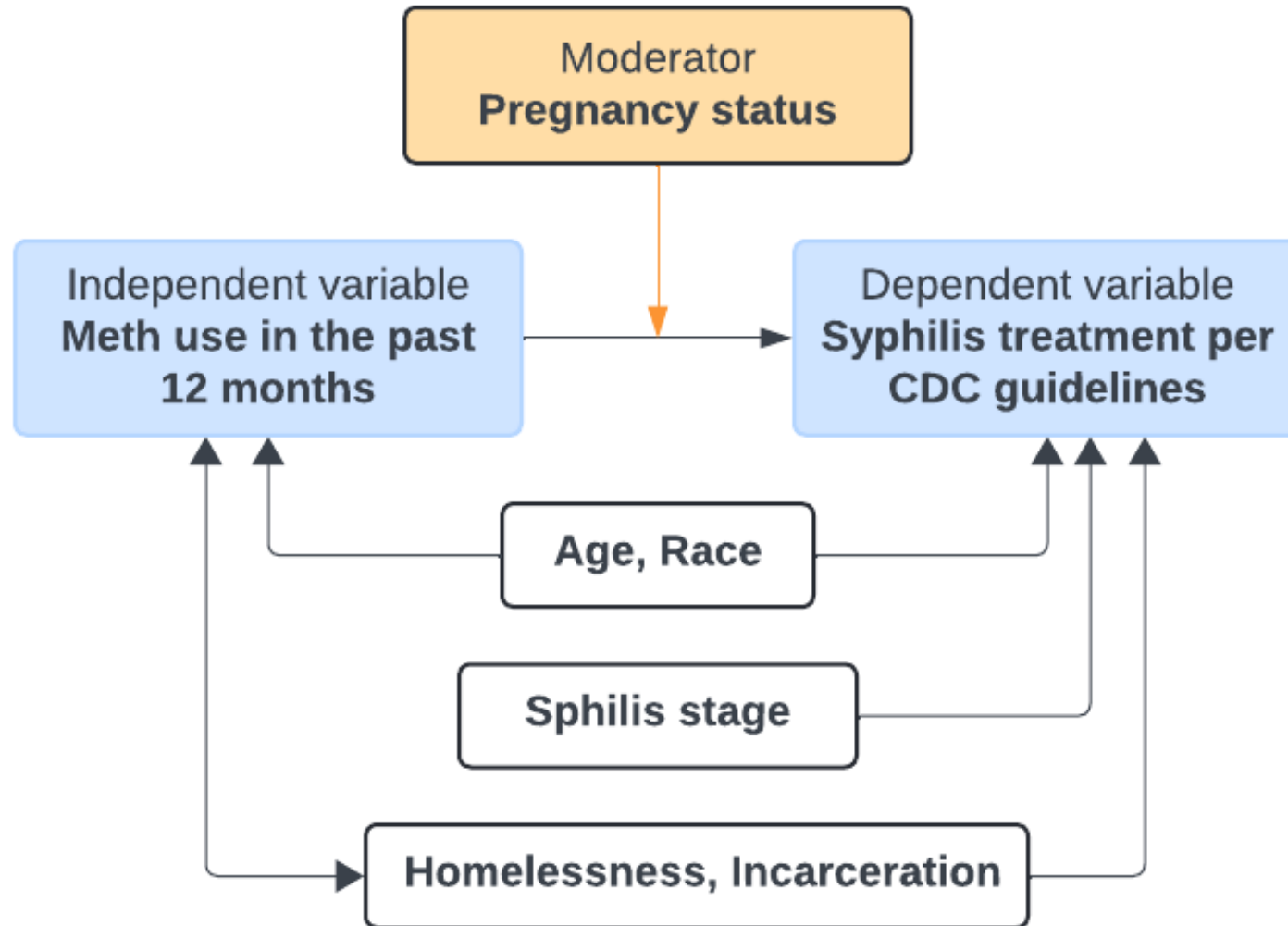
2.

Methods

Study Aims

1. Examine the Association Between Meth Use and Syphilis Treatment Among PRP
2. Assess the Impact of Pregnancy Status on Syphilis Treatment Outcomes

Conceptual Framework



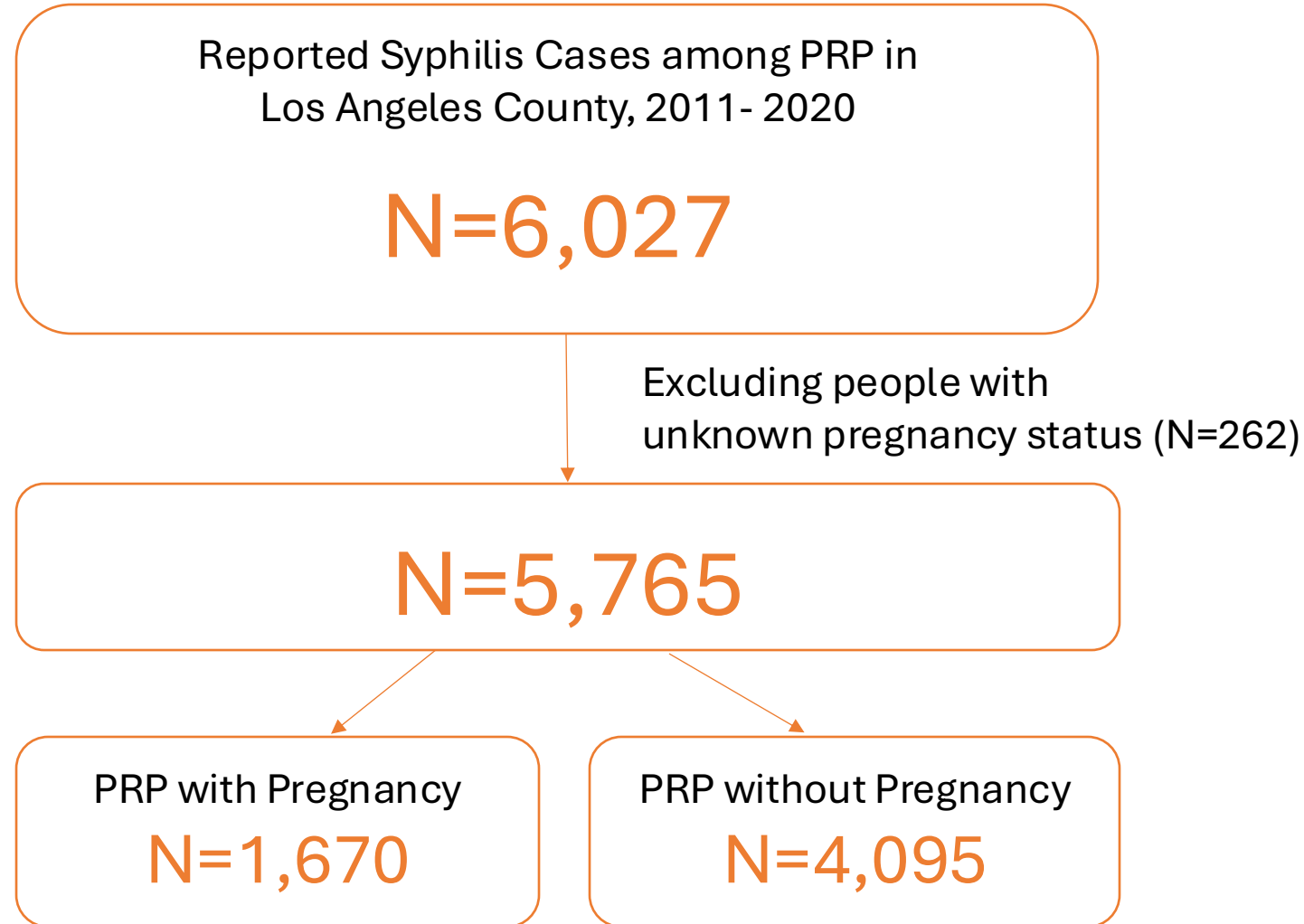
Data Source

Multi-year aggregated data: Syphilis surveillance data between 2011 and 2020

Division of HIV and STD Programs in the Los Angeles County Department of Public Health



Study Population



Statistical Analyses

1. **Descriptive analysis** for demographic characteristics, chi-square test to assess differences in categorical variables
2. **Nested Multivariate logistic regression** to examine the association of meth use & syphilis treatment, stratified by pregnancy status
 - **Model 1:** Unadjusted model
 - **Model 2:** Adjusted for demographic variables (age, race)
 - **Model 3:** Further adjusted for clinical syphilis stage (Primary & Secondary, Early Latent, Late Latent)
 - **Model 4: Full model,** Additionally adjusted for social vulnerabilities (homelessness, incarceration)
3. **Multivariate logistic regression with multiple imputation** to account for missing data and enhance the validity of the findings

3. Results

PRP Characteristics

- **Meth use:** 11.7% for PRP with pregnancy, 9.7% for PRP without pregnancy
- **Syphilis treatment:** 77% for PRP with pregnancy, 59% for PRP without pregnancy
- **Average age:** 29 years
- **Latinx:** 50% ; **Black:** 24%
- **Early syphilis:** 39%

PRP who are not pregnant

Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)	M.I. OR (95% CI)
	Age, Race	Age, Race Syphilis stage	Age, Race Syphilis stage Unhoused Incarceration	Age, Race Syphilis stage Unhoused Incarceration
1.64* (1.04, 1.30)	1.31* (1.04, 1.64)	1.08 (0.83, 1.40)	1.05 (0.80, 1.37)	1.19 (0.94, 1.52)

Model 4 did **not** show significant impact of meth use on syphilis treatment.

PRP who are pregnant

Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)	M.I. OR (95% CI)
	Age, Race	Age, Race Syphilis stage	Age, Race Syphilis stage Unhoused, Incarceration	Age, Race Syphilis stage Unhoused, Incarceration
0.56* (0.40, 0.77)	0.56* (0.40, 0.78)	0.49* (0.34, 0.69)	0.50* (0.35, 0.73)	0.52* (0.36, 0.75)

Model 4 showed that pregnant PRP using meth had **50% lower** odds of receiving syphilis treatment compared to pregnant PRP not using meth.

Results

- Meth use was associated with **50% lower** odds of syphilis treatment **only in PRP who are pregnant**, while showing no significant effect in PRP who are not pregnant.

Considerations

- **Data Limitations**

Missing 25% of meth use data, Under-reporting → Multiple imputation

- **Model Constraints**

Other confounding variables that may affect syphilis treatment access were not collected (e.g., intimate partner violence, insurance status, transportation access, poverty, etc.)



How do we interpret the results?

Reproductive Justice Framework emphasizes that individual's human rights include:



How do we interpret the results?

- Child protection services
 - Fear of losing child custody
- Concerns for existing substance use management and treatment
- Stigma and discrimination
 - Self and social stigma
 - Healthcare provider-related stigma

Source: Barber et al., 2023, Chan et al., 2021, Choi et al., 2022, Nidey et al., 2022, Park et al., 2022, Roberts and Pies, 2011, Schempf and Strobino, 2009, Stone, 2015, Thornton et al, 2022.



Illustration: Victoria Ellis for Yahoo; Photo: Getty Images

What remains to be learned?

Underlying mechanisms of meth use and CS

Low barrier prenatal care and syphilis testing

Confidential services linking PRP to care

Comprehensive case management

Collaboration beyond the field of STIs



Illustration: Victoria Ellis for Yahoo; Photo: Getty Images

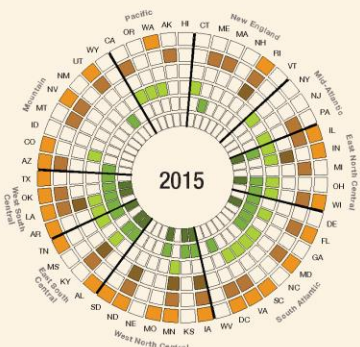
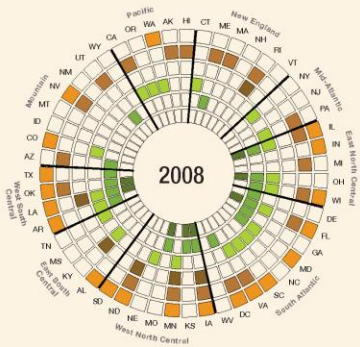
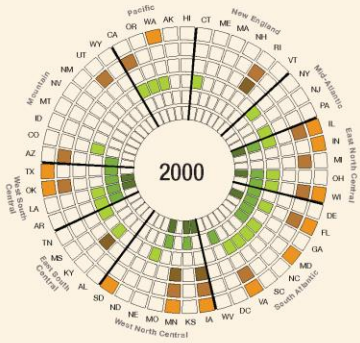
Acknowledgements

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STATE POLICIES RELATED TO Substance Use in Pregnancy



- Punitive
- Reporting
- Testing
- Targeted program
- Priority access
- Protected from discrimination

About These Policy Wheels

Policy wheels provide a visual overview of policy evolution and geographic concentration. The policy wheels shown here were created for six state policies related to substance use in pregnancy.^{1,2} Each wheel shows which policies were in effect in which states as of the year 2000, 2008, or 2015, respectively.

The shades of orange indicate punitive or potentially punitive policies that

1. define substance use in pregnancy as child abuse or neglect, criminalize it, or consider it grounds for civil commitment ("punitive")
2. require reporting of suspected prenatal substance use to officials at local health and human services departments ("reporting")
3. mandate testing of infants with suspected prenatal substance exposure or pregnant women with suspected substance use ("testing").

The shades of green indicate treatment-supportive policies that

1. create or fund targeted programs for pregnant and postpartum women with substance use disorders (SUDs) ("targeted program")
2. prioritize pregnant women's access to SUD treatment programs ("priority access")
3. prohibit discrimination against pregnant women in publicly funded SUD treatment programs ("protected from discrimination").

Policy Trends

The policy wheels show the evolution from 2000 to 2015 of state policy environments related to substance use in pregnancy. The number of states that had no policies specific to substance use in pregnancy dropped from 16 in 2000 to 10 in 2015. Punitive or potentially punitive policies were more commonly enacted than were policies supporting treatment for pregnant women with SUD; overall, there was no clear geographic pattern. In 2015, 25 states considered SUD in pregnancy to be child abuse, grounds for civil commitment, or a criminal act—nearly double the number in 2000. In contrast, there was only a modest increase in the number of states (from 29 to 33) with at least one treatment-supportive policy; the increase occurred predominantly between 2000 and 2015 and was concentrated in the East South Central region.

By 2015, the number of states that had only punitive or potentially punitive policies had increased from 6 to 8, while the number of states that had only treatment-supportive policies had declined from 17 to 8. The number of states with both types of policies doubled, from 12 in 2000 to 25 by 2015.

Methods and References

Information on these six policies, including effective dates, was obtained from the Guttmacher Institute,³ which annually reviews the LexisNexis database, routinely monitors state legislature and state agency websites, and conducts follow-up phone calls with policymakers, as needed. The RAND team supplemented these data with information from published studies, ProPublica, and the National Conference of State Legislatures.^{4,5}

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1. Laura J. Faherty, Ashley M. Kranz, Joshua Russell-Frith, Stephen W. Patrick, Jonathan Cantor, and Bradford D. Stein, "Association of Punitive and Reporting State Policies Related to Substance Use in Pregnancy With Rates of Neonatal Abstinence Syndrome," *JAMA Network Open*, Vol. 2, No. 11, November 13, 2019, p. e1914078.
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- Punitive
- Reporting
- Testing

- Targeted program
- Priority access
- Protected from discrimination

Faherty, Laura J., et al. "Association of punitive and reporting state policies related to substance use in pregnancy with rates of neonatal abstinence syndrome." *JAMA Network Open* 2.11 (2019): e1914078-e1914078

Link to the infographic.

<https://www.rand.org/pubs/infographics/IG148.html>

This infographic describes research conducted in RAND Social and Economic Well-Being and RAND Health Care and documented in Laura J. Faherty, Ashley M. Kranz, Joshua Russell-Frith, Stephen W. Patrick, Jonathan Cantor, and Bradford D. Stein, "Association of Punitive and Reporting State Policies Related to Substance Use in Pregnancy With Rates of Neonatal Abstinence Syndrome," *JAMA Network Open*, Vol. 2, No. 11, November 13, 2019, p. e1914078 (<https://doi.org/10.1001/jama.2019.1914078>). To view this infographic online, visit www.rand.org/pubs/infographics/IG148.html. The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities, organizations, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. RAND's publications do not reflect the opinions of its researchers and sponsors. RAND® is a registered trademark. Limited Print and Electronic Distribution Rights: This document and trademarks contained herein are protected by law. This representation of RAND intellectual property is provided for noncommercial use only. Unauthorized posting of this public access online is prohibited. Permission is given to duplicate this document for personal use only, as long as it is unaltered and complete. Permission is required from RAND to reproduce, or reuse in another form, any of our research documents for commercial use. For information on request and linking permissions, please visit [www.rand.org/policies.html](https://www.rand.org/pubs/policies.html).

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Appendix 1.

Demographic Characteristics by Pregnancy Status among PRP, including Unknown Pregnancy Status (N=262)

Pregnancy Status among Persons of Reproductive Potential (PRP) aged 15-44 years							
	Yes (N=1670)		No (N=4095)		Unknown (N=262)		
	N	%	N	%	N	%	
Age Group							
15-19	146	8.74	320	7.81	19	7.25	
20-24	438	26.23	812	19.83	44	16.79	
25-29	485	29.04	933	22.78	72	27.48	
30-34	351	21.02	788	19.24	56	21.37	
35-39	197	11.80	702	17.14	39	14.89	
40-44	53	3.17	540	13.19	32	12.21	
Race							
White	158	9.46	558	13.63	29	11.07	
Black	379	22.69	996	24.32	50	19.08	
Latinx	955	57.19	1965	47.99	107	40.84	
Asian	94	5.63	155	3.79	5	1.91	
NHPI	6	0.36	12	0.29	0	0.00	
AI/AN	2	0.12	14	0.34	2	0.76	
Two or more	1	0.06	2	0.05	0	0.00	
Other	10	0.60	69	1.68	9	3.44	
Unknown	65	3.89	324	7.91	60	22.90	
Syphilis Stage							
P&S	196	11.74	758	18.51	36	13.74	
EL	453	27.13	855	20.88	42	16.03	
LL/UNK	1021	61.14	2482	60.61	184	70.23	
Unhoused							
No	1575	94.31	3481	85.01	250	95.42	
Yes	95	5.69	614	14.99	12	4.58	
Incarceration Status/History							
No	1449	86.77	3445	84.13	233	88.93	
Yes	221	13.23	650	15.87	29	11.07	
Methamphetamine Use							
No	1475	88.32	3684	89.96	252	96.18	
Yes	195	11.68	411	10.04	10	3.82	

Appendix 2.

Demographic Characteristics by Pregnancy Status among PRP

	Yes (N=1,670)		No (N=4,095)		χ^2 or M-H χ^2	P-value
	N	%	N	%		
Age Group					181.81	<.0001
15-19	146	8.74	320	7.81		
20-24	438	26.23	812	19.83		
25-29	485	29.04	933	22.78		
30-34	351	21.02	788	19.24		
35-39	197	11.80	702	17.14		
40-44	53	3.17	540	13.19		
Race					10.98	0.001
White	158	9.46	558	13.63		
Black	379	22.69	996	24.32		
Latinx	955	57.19	1965	47.99		
Asian	94	5.63	155	3.79		
NHPI	6	0.36	12	0.29		
AIAN	2	0.12	14	0.34		
Two or more	1	0.06	2	0.05		
Other	10	0.60	69	1.68		
Unknown	65	3.89	324	7.91		
Syphilis Stage					53.35	<.0001
Primary & Secondary	196	11.74	758	18.51		
Early Latent	453	27.13	855	20.88		
Late Latent or Unknown	1021	61.14	2482	60.61		
Homelessness					95.23	<.0001
No	1575	94.31	3481	85.01		
Yes	95	5.69	614	14.99		
Incarceration Status/History					6.44	0.011
No	1449	86.77	3445	84.13		
Yes	221	13.23	650	15.87		
Methamphetamine Use					3.39	0.066
No	1475	88.32	3684	89.96		
Yes	195	11.68	411	10.04		
Syphilis treatment					170.12	<.0001
No	386	23.11	1691	41.29		
Yes	1284	76.89	2404	58.71		

Appendix 3.

PRP who are not pregnant

Model 1: Unadjusted model.

Model 2: Adjusted for demographic variables (age, race).

Model 3: Further adjusted for clinical stage (syphilis stage).

Model 4: Full model, additionally adjusted for social vulnerabilities (homelessness, incarceration).

	Model 1		Model 2		Model 3		Model 4	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Methamphetamine use	1.30	1.04 , 1.64	1.31	1.04 , 1.64	1.08	0.83 , 1.40	1.05	0.80 , 1.37
Age Group								
15-19			0.99	0.73 , 1.33	0.71	0.51 , 0.99	0.72	0.51 , 1.01
20-24			1.03	0.81 , 1.30	0.85	0.65 , 1.10	0.84	0.65 , 1.10
25-29			0.97	0.77 , 1.22	0.85	0.66 , 1.10	0.84	0.65 , 1.08
30-34			0.92	0.73 , 1.16	0.78	0.60 , 1.01	0.77	0.60 , 1.01
35-39			0.96	0.76 , 1.23	0.94	0.72 , 1.23	0.93	0.71 , 1.21
40-44			Ref.		Ref.		Ref.	
Race								
AI/AN			0.38	0.13 , 1.11	0.56	0.17 , 1.80	0.58	0.18 , 1.88
Other			0.87	0.51 , 1.46	0.83	0.46 , 1.51	0.89	0.49 , 1.63
Asian			2.54	1.60 , 4.05	3.40	2.09 , 5.55	3.31	2.02 , 5.41
Black			0.98	0.78 , 1.23	0.85	0.66 , 1.10	0.88	0.68 , 1.13
Latinx			1.02	0.83 , 1.25	1.15	0.91 , 1.44	1.16	0.93 , 1.46
NHPI			1.48	0.40 , 5.54	1.53	0.37 , 6.42	1.59	0.38 , 6.69
Two or more			0.47	0.03 , 7.59	0.31	0.01 , 8.60	0.34	0.01 , 9.56
Unknown			0.76	0.57 , 1.02	0.93	0.68 , 1.28	0.99	0.72 , 1.37
White			Ref.		Ref.		Ref.	
Syphilis Stage								
P&S					16.55	12.09 , 22.65	16.40	11.97 , 22.46
EL					11.87	9.11 , 15.46	11.74	9.01 , 15.30
LL/UNK					Ref.		Ref.	
Homelessness							1.88	1.50 , 2.37
Incarceration							1.08	0.88 , 1.33

*Significant predictors are highlighted in **yellow**.

Appendix 4.

PRP who are pregnant

Model 1: Unadjusted model.

Model 2: Adjusted for demographic variables (age, race).

Model 3: Further adjusted for clinical stage (syphilis stage).

Model 4: Full model, additionally adjusted for social vulnerabilities (homelessness, incarceration).

	Model 1		Model 2		Model 3		Model 4	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Methamphetamine use	0.56	0.40 , 0.77	0.56	0.40 , 0.78	0.49	0.34 , 0.69	0.50	0.35 , 0.73
Age Group								
15-19			3.51	1.63 , 7.58	3.03	1.36 , 6.72	3.10	1.39 , 6.91
20-24			1.88	1.00 , 3.52	1.71	0.89 , 3.29	1.74	0.90 , 3.36
25-29			1.62	0.87 , 3.02	1.52	0.80 , 2.91	1.55	0.81 , 2.96
30-34			1.33	0.71 , 2.49	1.31	0.68 , 2.53	1.34	0.69 , 2.58
35-39			1.38	0.71 , 2.68	1.47	0.73 , 2.94	1.48	0.74 , 2.98
40-44			Ref.		Ref.		Ref.	
Race								
AI/AN			N/A		N/A		N/A	
Other			0.45	0.12 , 1.68	0.50	0.12 , 2.03	0.49	0.12 , 2.00
Asian			2.16	1.14 , 4.12	3.01	1.55 , 5.82	2.97	1.53 , 5.75
Black			1.08	0.71 , 1.65	1.06	0.68 , 1.66	1.07	0.69 , 1.66
Latinx			1.61	1.10 , 2.35	1.75	1.17 , 2.61	1.75	1.17 , 2.61
NHPI			N/A		N/A		N/A	
Two or more			N/A		N/A		N/A	
Unknown			0.73	0.39 , 1.35	0.82	0.43 , 1.57	0.82	0.43 , 1.58
White			Ref.		Ref.		Ref.	
Syphilis Stage								
P&S					7.29	4.06 , 13.09	7.33	4.08 , 13.18
EL					5.13	3.60 , 7.32	5.12	3.59 , 7.30
LL/UNK					Ref.		Ref.	
Homelessness							1.10	0.64 , 1.87
Incarceration							0.88	0.61 , 1.27

*Significant predictors are highlighted in **yellow**.