

# Congenital syphilis in Oregon: perceptions, predictors, and prevention

tim w menza, md, phd

Assistant Professor, OHSU ID

Medical Director, OHA HIV/STD/TB Program

Oregon Perinatal Collaborative Summit

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# Disclosures

- I have no conflicts of interest to declare

# Objectives

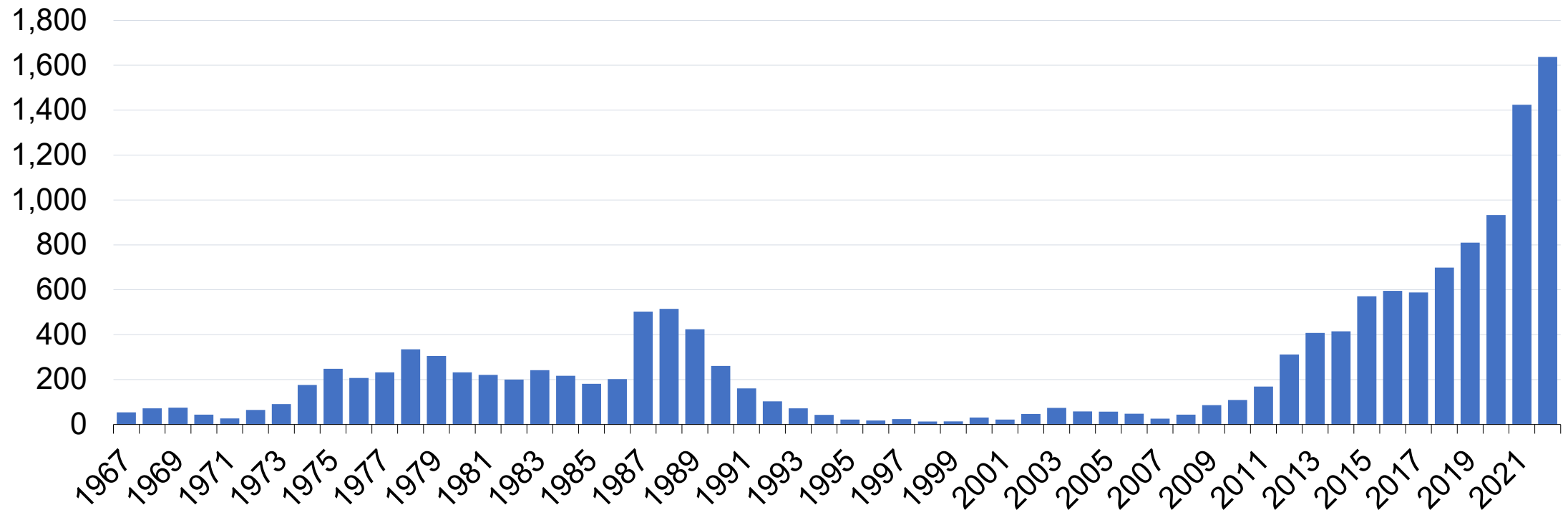
- Describe the epidemiology of syphilis and congenital syphilis in Oregon
- Review Oregon-based screening recommendations for syphilis
- Discuss the findings of an anonymous survey of prenatal care providers
- Explore multi-level predictors of being associated with a case of congenital syphilis among pregnant people with syphilis
- Describe how Oregon is using these data to inform CS prevention

# Disclaimer

- I will present data on congenital syphilis by race and ethnicity.
- Race is a social construct.
- Racism, not race, leads to inequities in congenital syphilis.

# Early syphilis diagnoses are the highest they've been in recent history

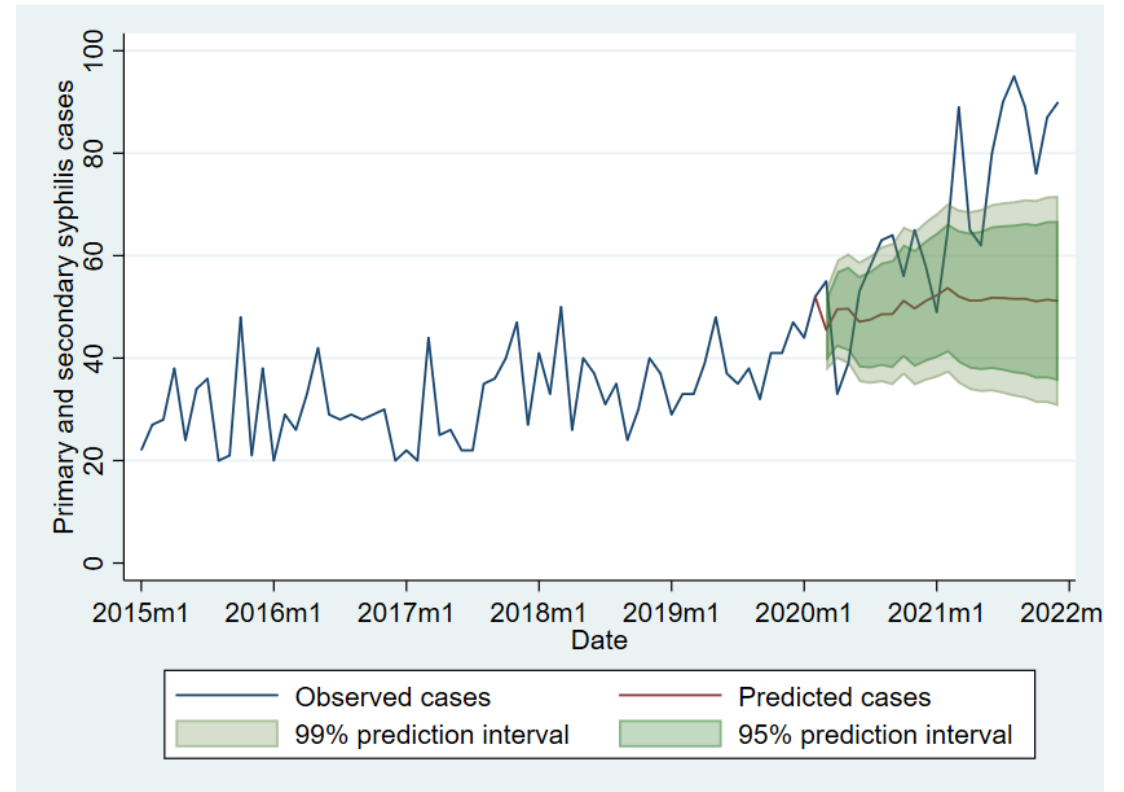
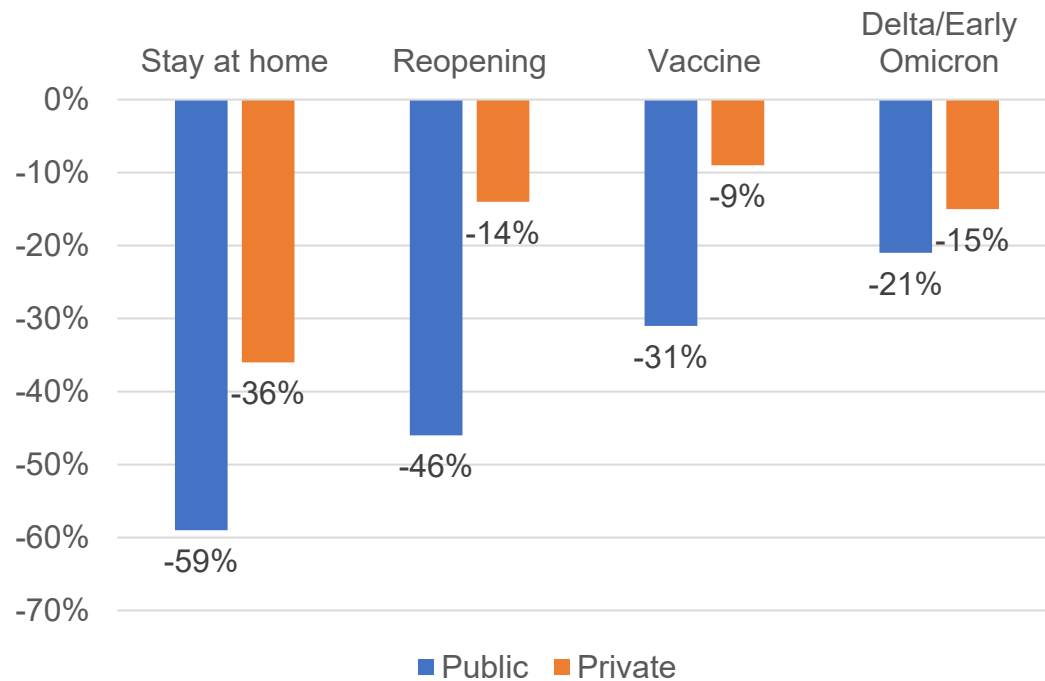
Cases of primary, secondary and non-primary non-secondary syphilis (early syphilis), 1967-2022



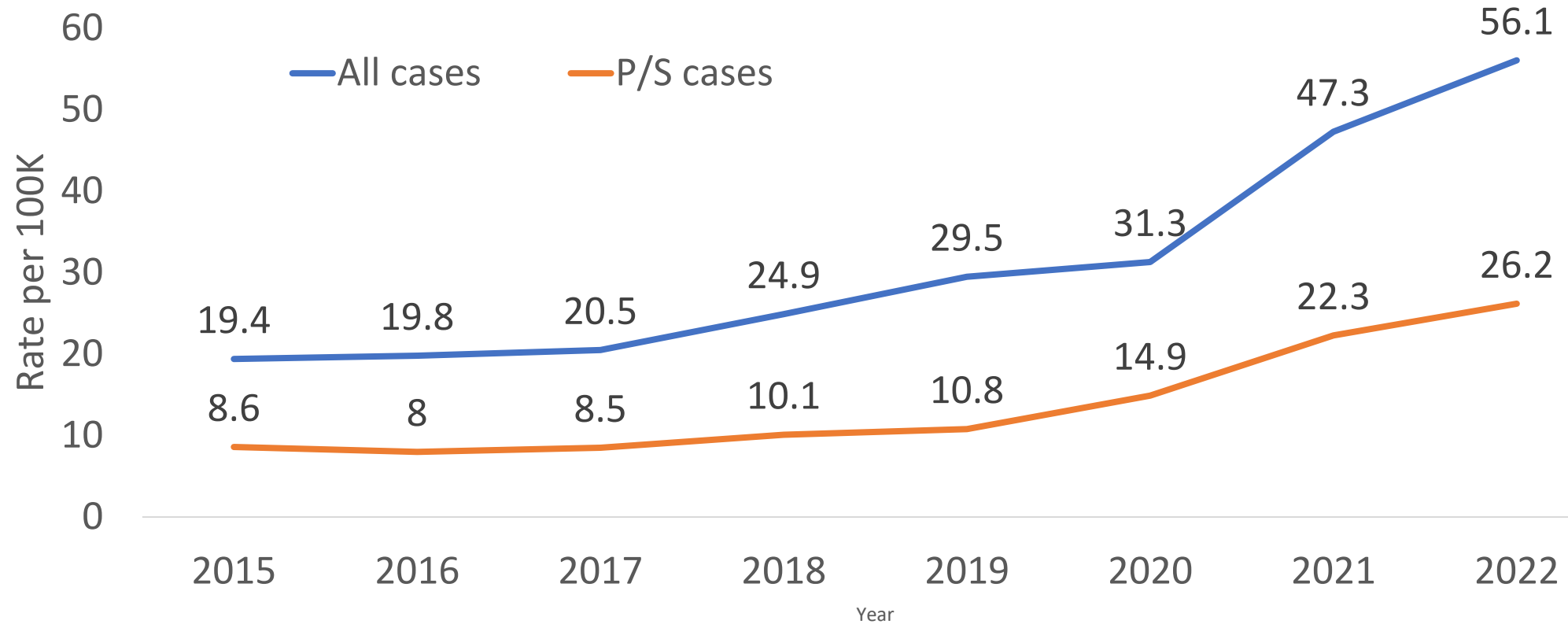
# Despite reductions in testing, we observed a ~30% excess in P&S cases during COVID

Menza et al, STD, 2020 and 2023.

% reductions in public and private sector syphilis testing compared to 1/2019-2/2020, Oregon

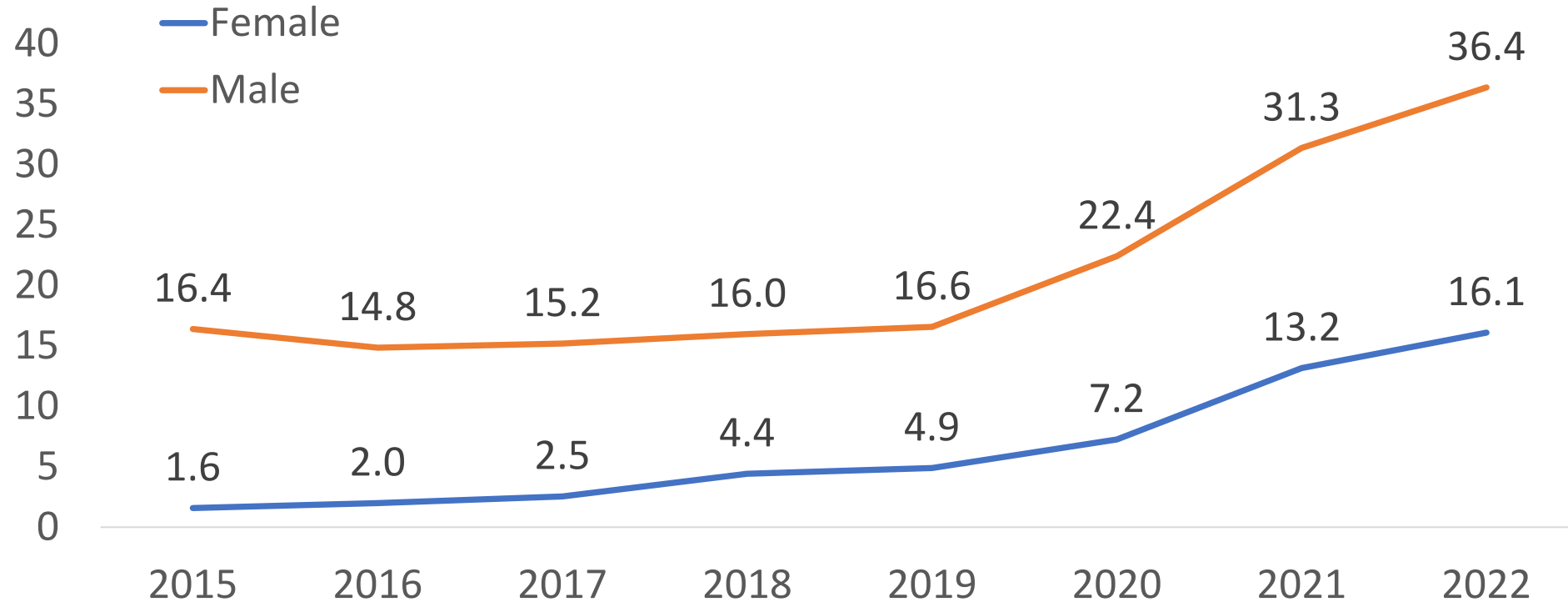


# There was a large increase in syphilis diagnoses from 2020 to 2021



Between 2019 to 2021, there was an almost 3-fold increase in P&S syphilis among people assigned female at birth

Rate of primary and secondary syphilis by sex at birth, Oregon, 2015-2022





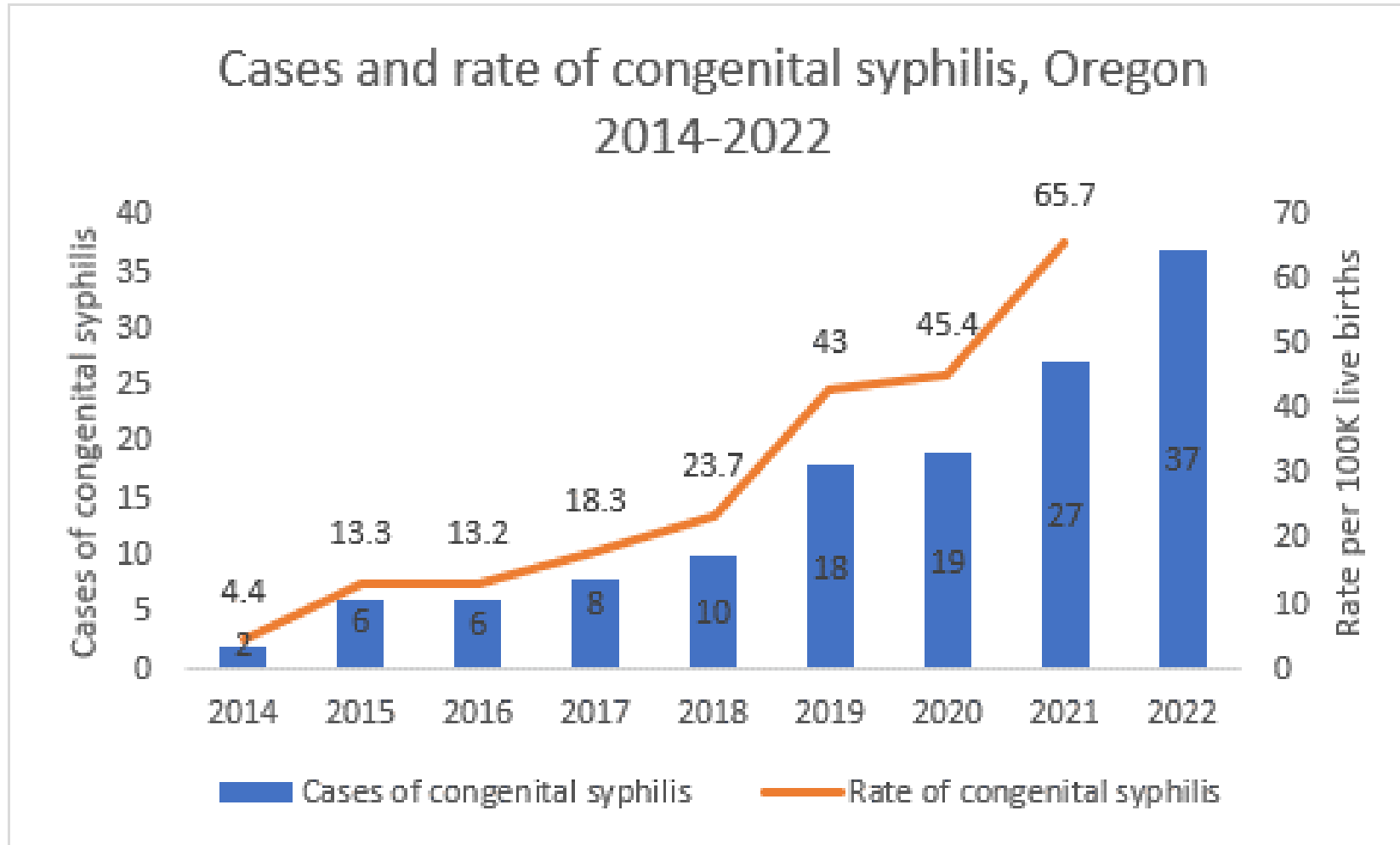
## Syphilis Cases among People Assigned Female at Birth Interviewed for Partner Services by Stage and Risk, Oregon, 2021

	N	%	N	%
<b>Total cases (% interviewed)</b>	388	68%	225	52%
	Stage			
	Early		Late	
	N	%	N	%
<b>Total interviewed cases</b>	265	100%	116	100%
<b>Individual-level risk</b>				
<b>Methamphetamine</b>	75	28%	46	40%
<b>PWID</b>	53	20%	26	22%
<b>Houseless or unstably housed</b>	39	15%	24	21%
<b>Transactional sex</b>	16	6%	8	7%
<b>Criminal justice involvement</b>	11	4%	4	3%
<b>Prior STI (prior 2 years) and HIV/HCV (ever)</b>				
<b>Prior chlamydia</b>	39	15%	15	13%
<b>Prior gonorrhea</b>	37	14%	21	18%
<b>Prior syphilis</b>	16	6%	4	3%
<b>Prior HCV case</b>	4	2%	4	4%
<b>Prior HIV case</b>	1	<1%	0	0%
<b>Partner-level risk</b>				
<b>Partner: PWID</b>	75	28%	42	36%
<b>Partner: Houseless</b>	4/81	5%	3/27	11%
<b>Partner: criminal justice involvement</b>	3/81	4%	0	0%
<b>Risk Identified (any of above)</b>	143	54%	65	56%
<b>No Risk Identified</b>	122	46%	51	44%

# Updates to Oregon-specific Syphilis Screening Recommendations

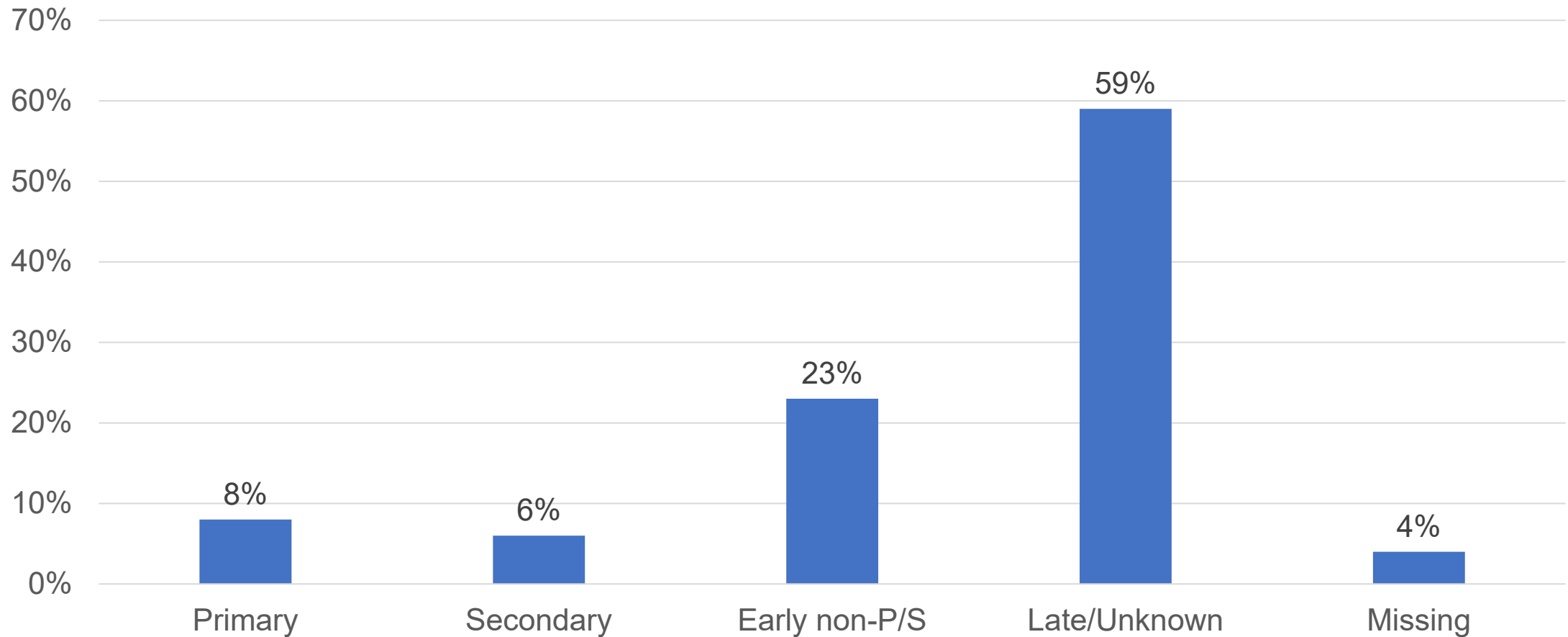
- Screen all sexually active adults under 45 years of age at least once if they have not been screened since 1/1/2021
- This recommendation is in addition to screening during pregnancy

# There were 2 cases of CS in 2014 and 37 cases of CS in 2022 (n=133)



# Most pregnant people associated with a case of CS are diagnosed with late/unknown duration syphilis

Syphilis stage at diagnosis, Oregon, 2014-2022



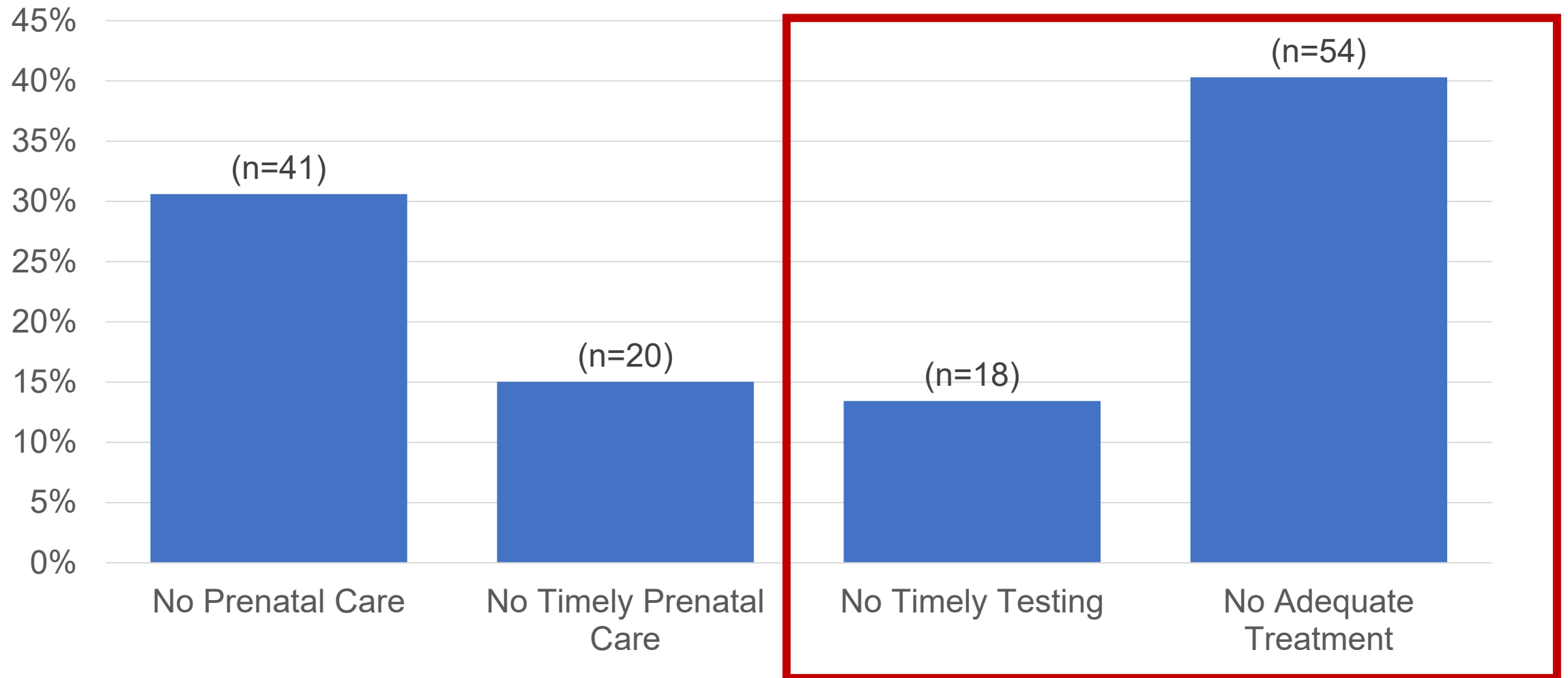
# Recommendations for Syphilis Screening in Pregnancy in Oregon

Boodman et al. CJPH, 2023: triple screening is highly cost-avoidant  
Hersh et al. Obs Gyn, 2018: third trimester screening is cost effective

- Screen at first presentation to care
- Screen again at 24-28 weeks (early third trimester)
  - We recommend pairing with an oral glucose tolerance test
    - Allows enough time to arrange for treatment
    - Detects seroconversion and re-infection
- Screen at delivery

**All visits are prenatal visits:** at presentation to ER/urgent care, carceral settings, and substance use disorder treatment when syphilis/prenatal care status is unknown

# Lack of access to prenatal care and inadequate treatment are the most common missed opportunities to prevent CS

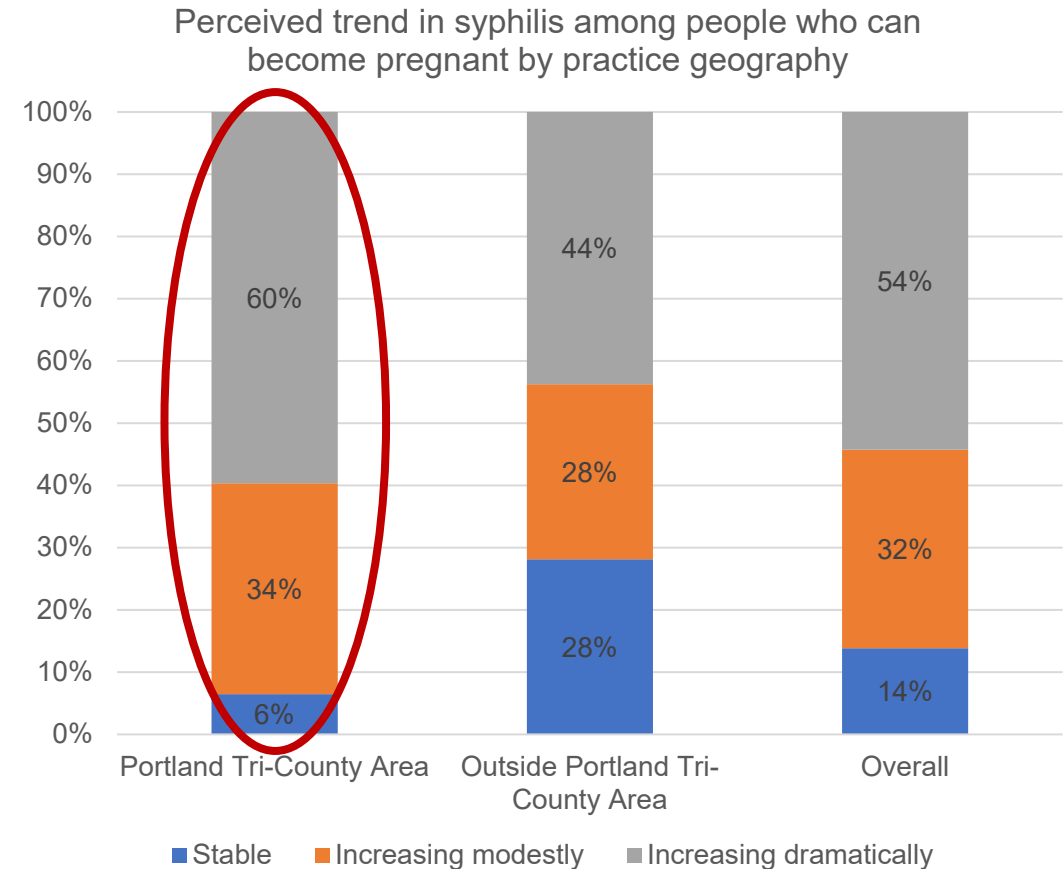
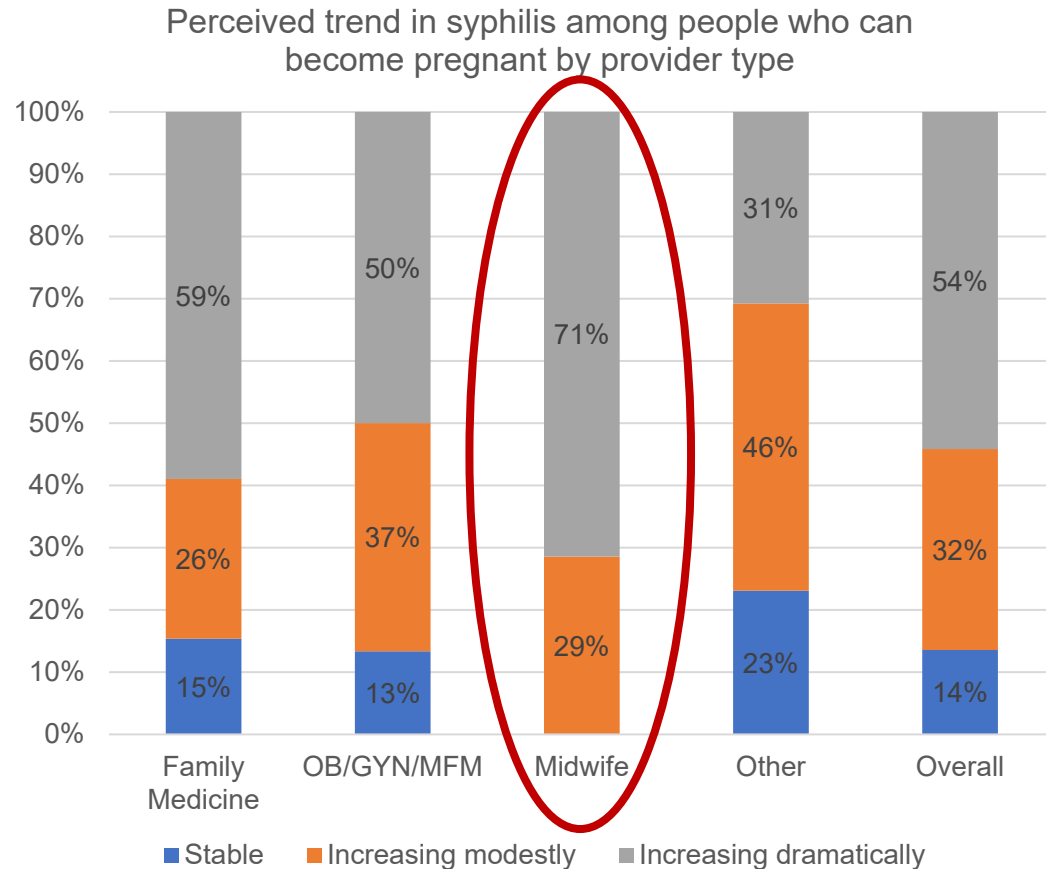


# Anonymous survey of prenatal care clinicians in Oregon

- Issued via Oregon Health Alert Network and professional societies of prenatal care clinicians
- Survey was open from January-March 2021
- N = 96

Characteristic, n (%)	N = 96
Specialty	
Family medicine	39 (41%)
OB/GYN/MFM	30 (31%)
Midwife	14 (15%)
Other (PA, NP, internal med, preventive med)	13 (14%)
Years in practice	
Less than 5 years	26 (27%)
5-10 years	21 (22%)
More than 10 years	49 (51%)
Number of pregnant people seen per year	
Less than 50	47 (49%)
More than 50	49 (51%)
Practice in Portland Tri-County Area	62 (65%)

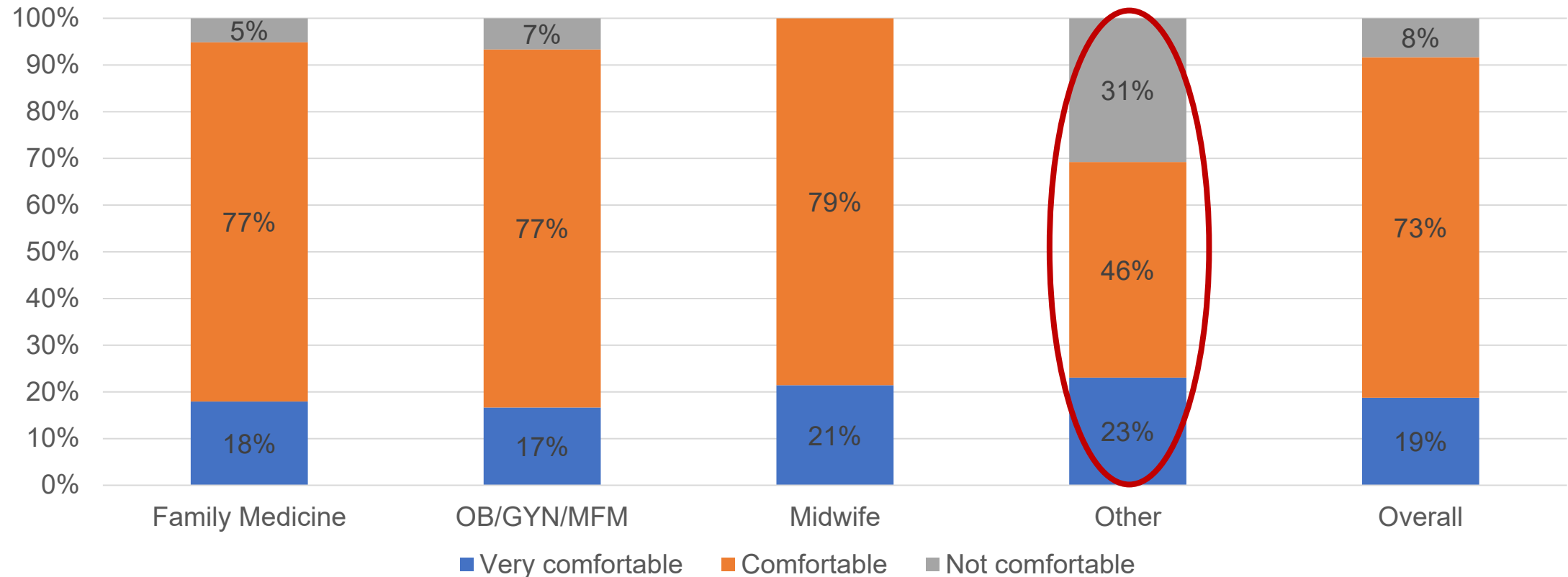
# Overall, 54% perceived that syphilis has been increasing dramatically



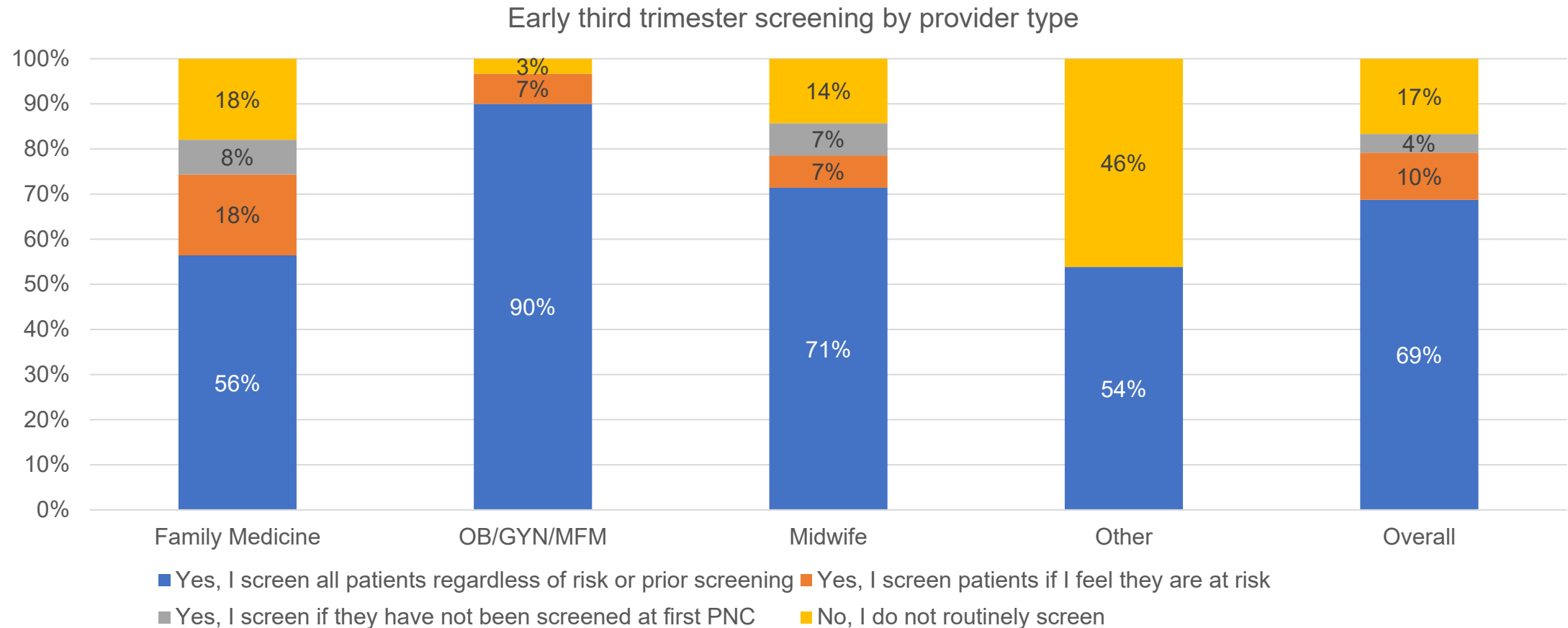


# Only 19% reported being very comfortable interpreting syphilis serologic testing

Comfort with interpreting syphilis serologies by provider type



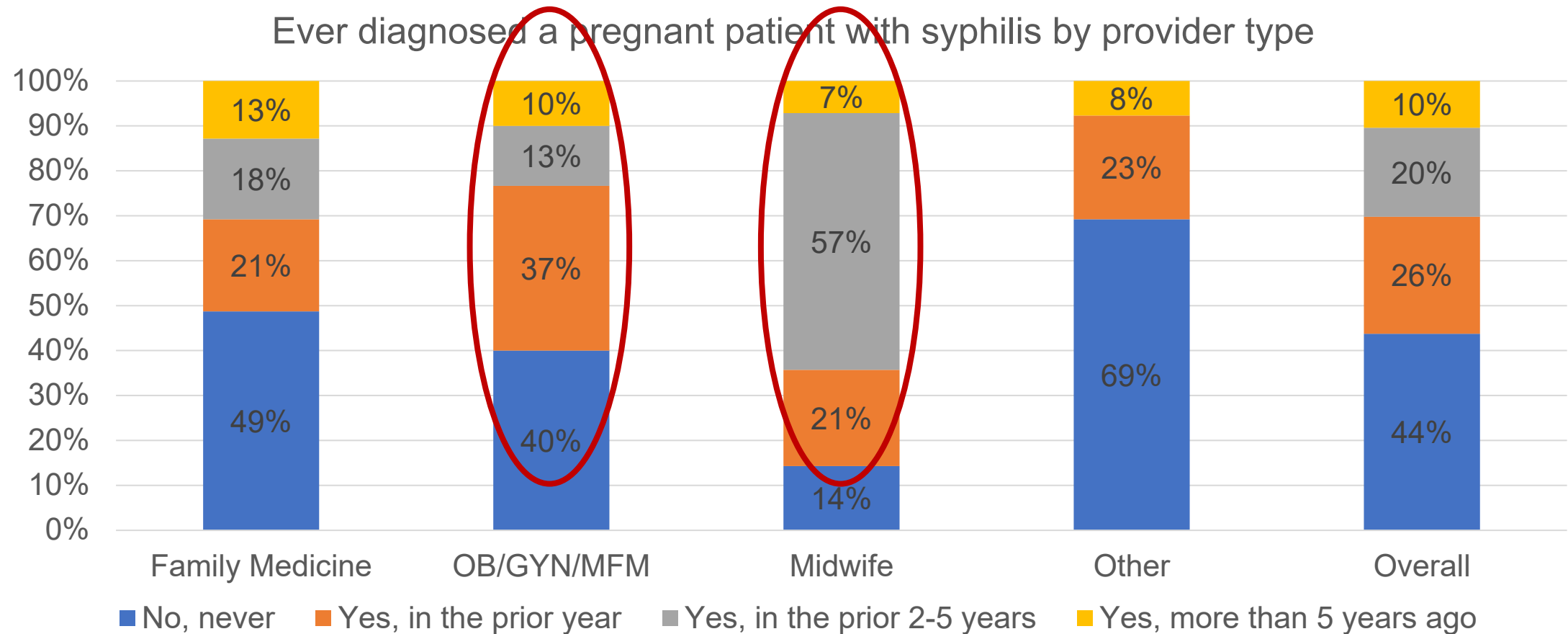
# While almost all clinicians offer routine screening at the first prenatal care visit, only 69% screen routinely in the early third trimester



# Most reported no barriers to screening

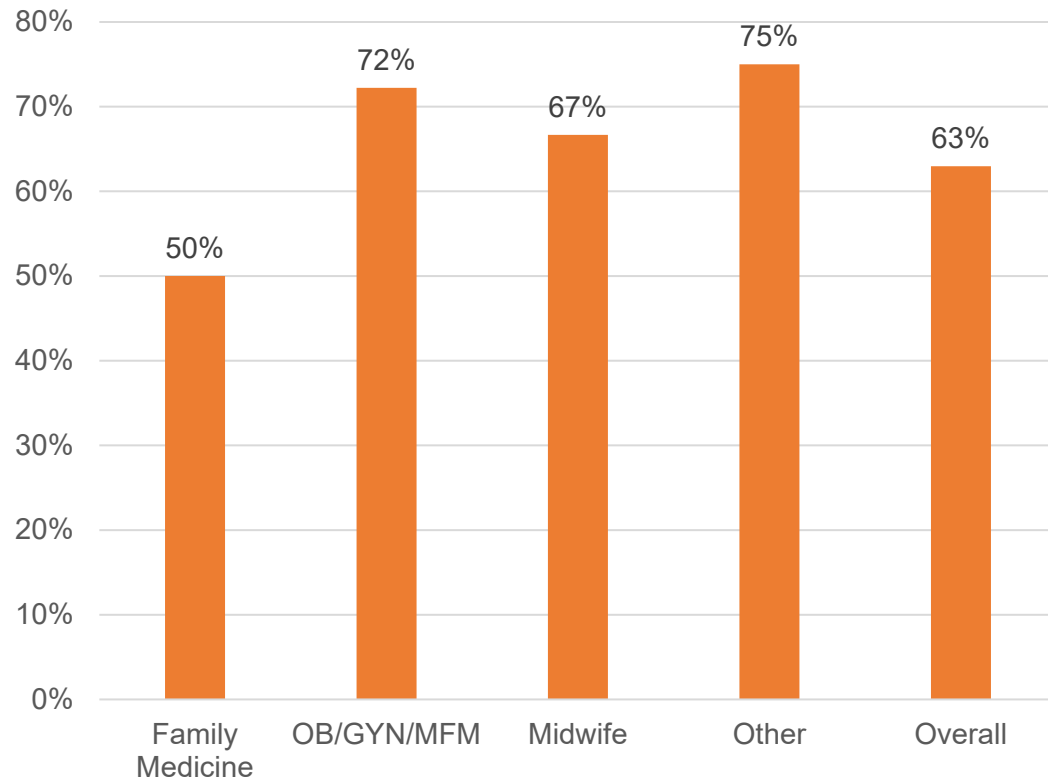
Barriers to screening	n = 96
No barriers	74 (77%)
The guidelines for syphilis screening in pregnancy are not clear	6
My patients do not want to be screened for syphilis	4
Patients do not get labs drawn	3
I'm not sure what tests to order	2
I am concerned that insurance will not reimburse for several screenings in pregnancy	2
Patients do not show up for appointments	2
The clinic where I work does not have a lab on site	1
Syphilis screening is too costly for my patients	1
My patients do not feel comfortable talking about sex and substance use	1
I'm not comfortable interpreting the results of syphilis testing	1
Health system changes to screening practices	1
Third trimester screening is an additional visit	1

# 56% had ever diagnosed syphilis in a pregnant person, 26% in the prior year

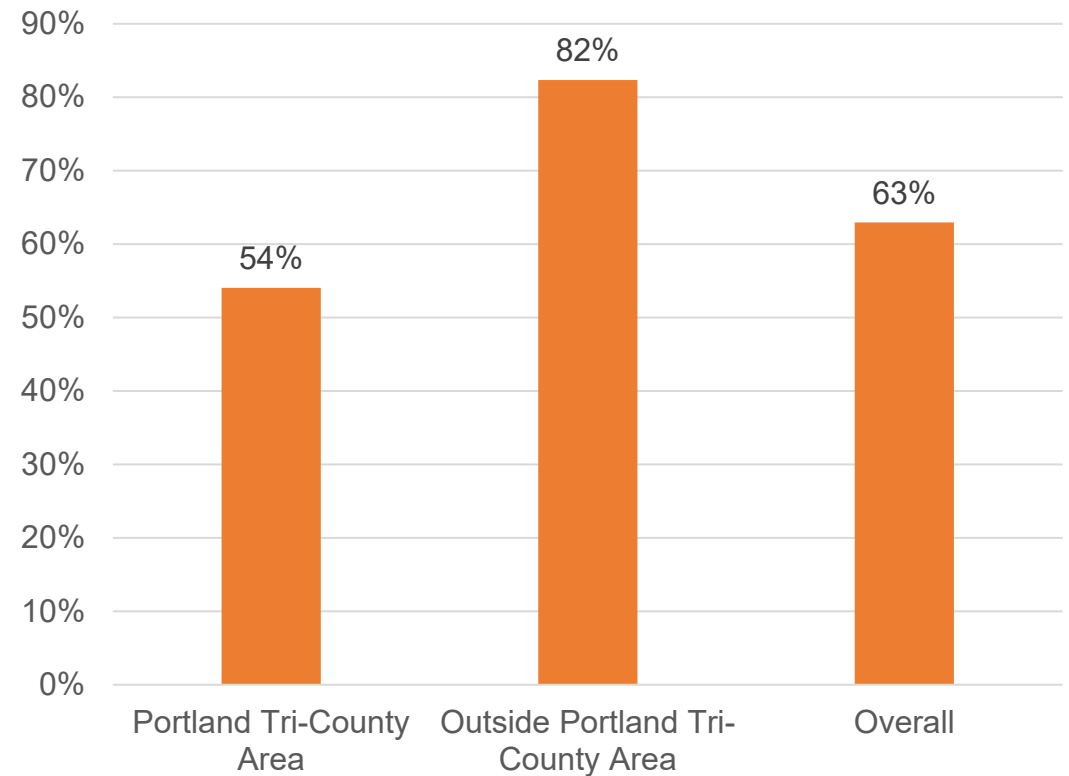


# Among those who had ever diagnosed a patient with syphilis, 63% reported working with their local health department

Did you work with the local health department after diagnosis? by provider type



Did you work with the local health department after diagnosis? by practice geography

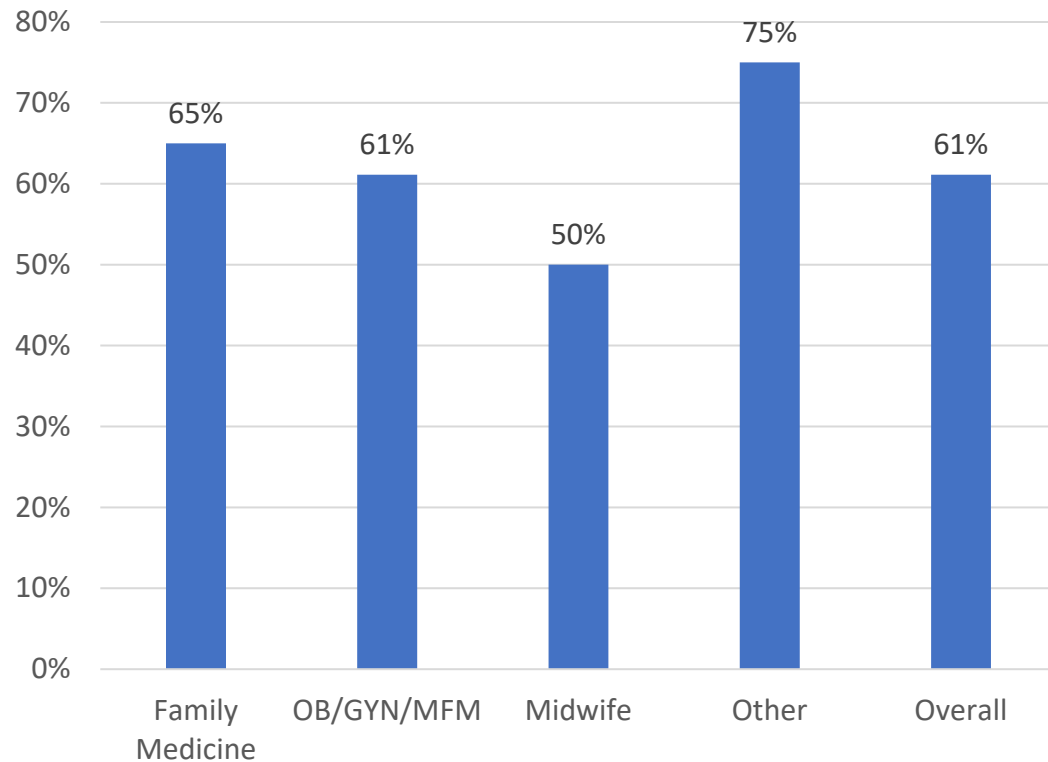


# Local health departments provided partner services, treatment, follow-up, consultation and records

How did the local health department help?	N = 34
The health department contacted my patient's partners for testing and treatment	22 (65%)
The health department arranged patient treatment at a public health clinic	13 (38%)
The health department arranged for follow-up testing at a public health clinic	8 (24%)
The health department provided Bicillin so that I could provide treatment in the clinic where I work	5 (15%)
The health department put me in contact with someone with expertise in syphilis diagnosis and/or treatment	4 (12%)
The health department helped me find records of prior syphilis diagnosis and treatment	2 (6%)

# Among those who had ever diagnosed a patient with syphilis, 61% reported managing syphilis themselves

Manage and treat pregnant people with syphilis by provider type



Barriers experienced when managing syphilis in pregnancy	N = 33
Pregnant patients with syphilis do not follow-up for treatment and repeat testing	11 (33%)
I have never seen the physical exam findings of primary and secondary syphilis	8 (24%)
The clinic where I work does not stock Bicillin	6 (18%)
I am not familiar with how to treat pregnant patients with a penicillin allergy	3 (9%)
I'm not comfortable interpreting changes in RPR titers over time	2 (6%)
I'm not familiar with how to stage syphilis	2 (6%)
I cannot take on the frequent follow-up required to manage pregnant patients with syphilis	1 (3%)
Infrequent cases in rural practice	1 (3%)

# Increasing provider knowledge



- Publication of comprehensive best practices for the prevention of CS with the Oregon Perinatal Collaborative
  - Increase access to care
  - Increase the quality of care
  - Enhance provider education
  - Build and maintain strong partnerships

## Emerging Practices for Responding to the Congenital Syphilis Emergency in Oregon: Recommendations for Health Care Providers

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# Increasing provider knowledge

- CS detailing and consultation
- Regular provider education throughout the state
- Facilitation of provider-LPHA connections (“matchmaking”)
- Quarterly CS case review boards

**BAY AREA HOSPITAL  
GRAND ROUNDS**

## AN UPDATE ON SYPHILIS

Presented by:  
**DR. TIMOTHY MENZA**  
MEDICAL DIRECTOR HIV/STD/TB SECTION  
PUBLIC HEALTH DIVISION  
OREGON HEALTH AUTHORITY

**! SYPHILIS CASES ARE ON THE RISE IN COOS COUNTY:  
WITH 16 TOTAL CASES IN 2022,  
2023 HAS ALREADY SEEN 16 NEW CASES BY MARCH**

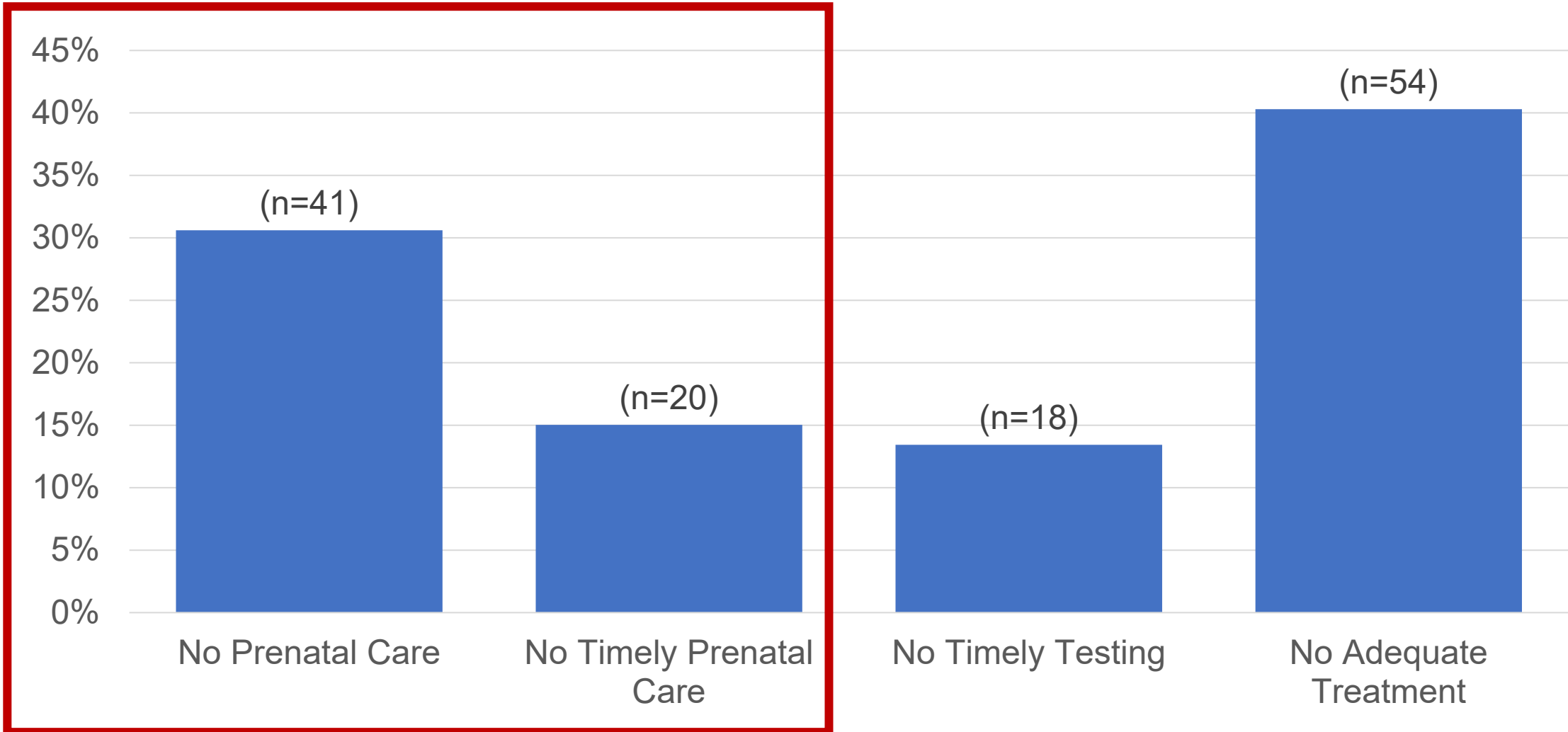
**April 27 2023  
12:30 pm**

**Myrtle Conference Room  
and via Zoom.**

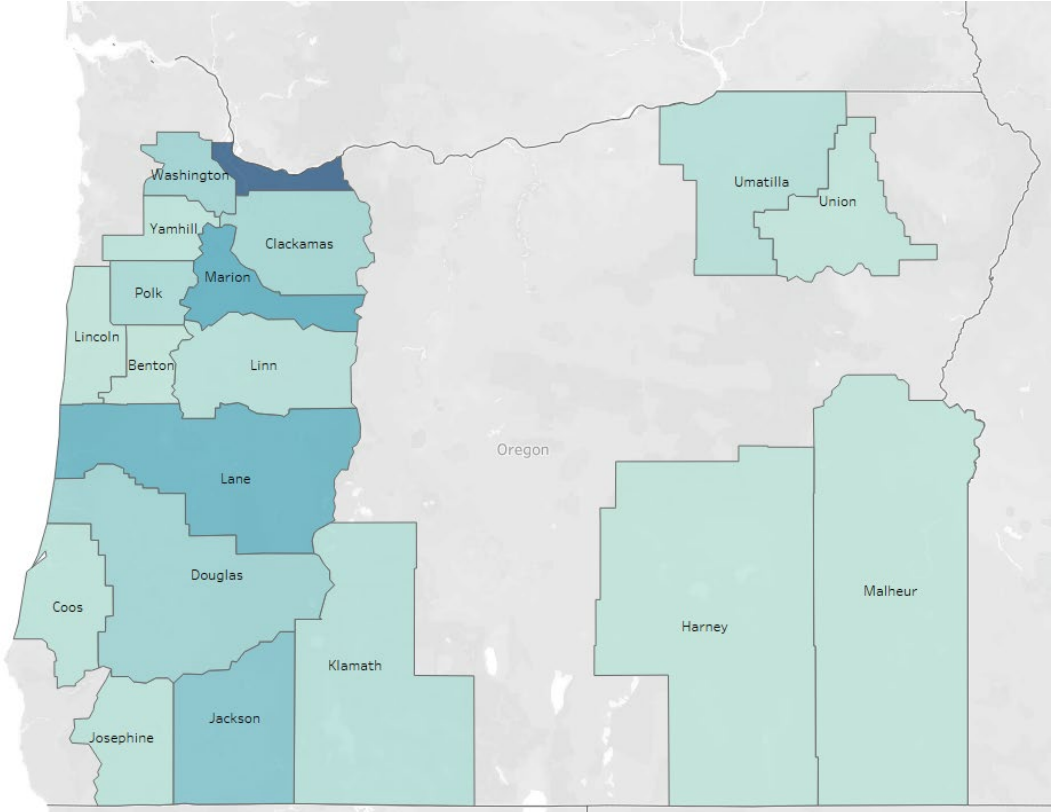
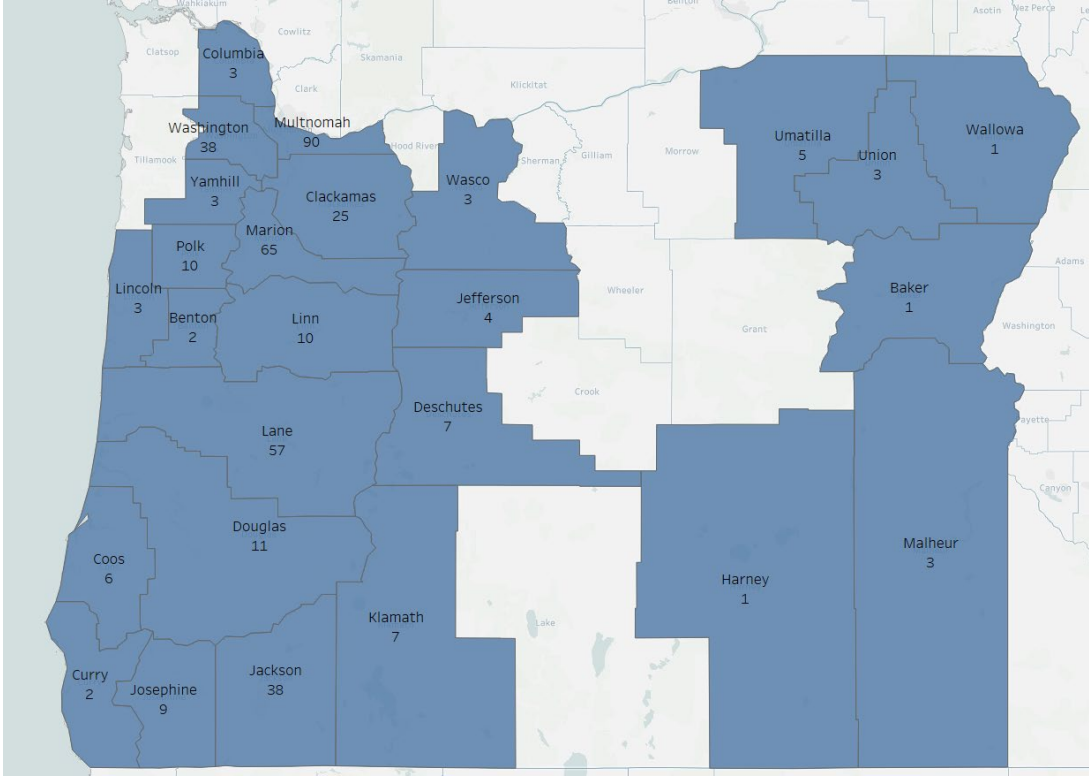
# Facilitating screening and treatment

- The rates of CS and syphilis among people who can become pregnant as public health accountability metrics
- Advocate for OR Medicaid to adopt metrics to track and incentivize screening at three time points in pregnancy
- OCHIN EPIC alerts for screening
- Support laboratory capacity to perform syphilis testing to avoid delays related to send-out testing
- Bicillin access program

# Lack of access to prenatal care and inadequate treatment are the most common missed opportunities to prevent CS



As of 2022, 26 counties have reported a syphilis diagnosis in a pregnant person and 19 have reported a CS case



Among pregnant people associated with a case of CS, housing instability and criminal justice involvement are very common

## **Housing**

- 49/133 (37%) were houseless or unstably housed

## **Criminal justice involvement (2014-2021 only)**

- 54/95 (57%) had any history of criminal justice involvement
  - 17/95 (18%) had criminal justice involvement in the 12 months prior to syphilis diagnosis, including incarceration, community supervision, outstanding cases or warrants

Many pregnant people associated with a case of CS report substance use or have had prior STI diagnoses

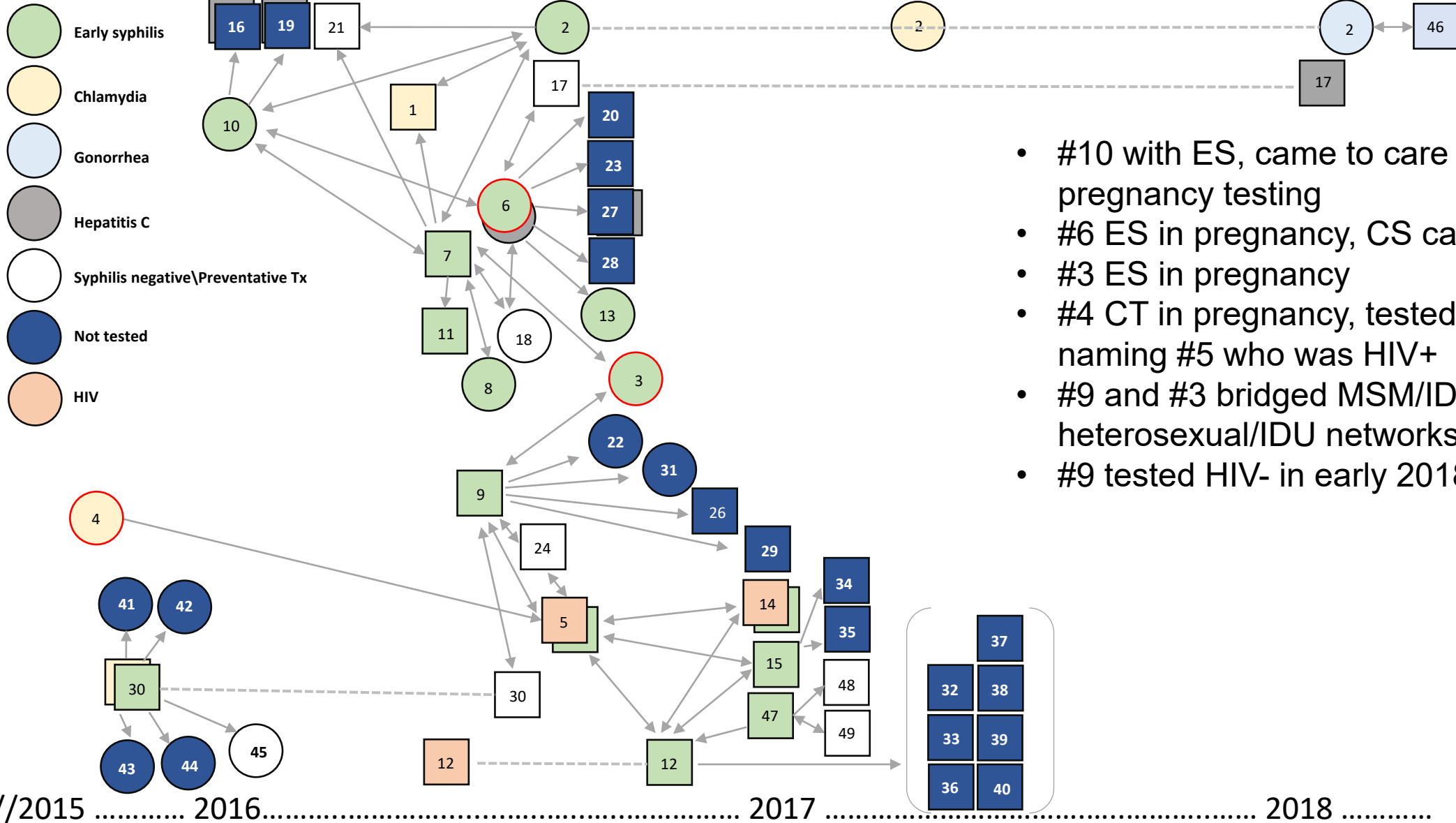
### **Substance use**

- 57/133 (43%) had a history of injection drug use
- 60/133 (45%) had a history of methamphetamine use
- 30/133 (23%) had a history of heroin/opiate use

### **HIV/STI and HCV**

- Most patients reported 1 male sexual partner in the prior 12 months (max = 8)
- None were known to be living with HIV
- 63/133 (47%) had a history of either chlamydia or gonorrhea
- 18/133 (14%) had chronic HCV prior to syphilis diagnosis in pregnancy

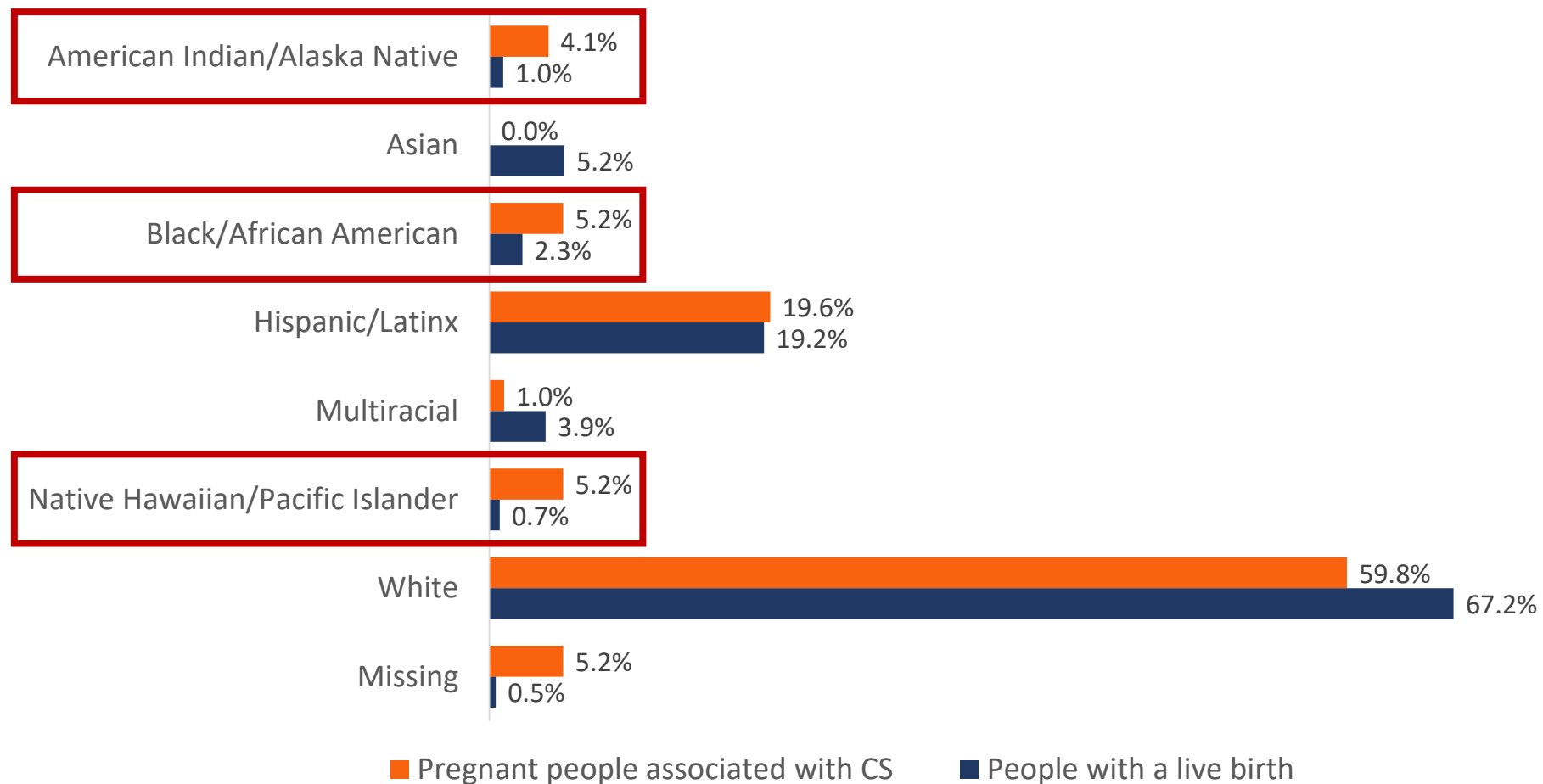
# Syphilis contact network



- #10 with ES, came to care for HIV/STI and pregnancy testing
- #6 ES in pregnancy, CS case
- #3 ES in pregnancy
- #4 CT in pregnancy, tested HIV- after naming #5 who was HIV+
- #9 and #3 bridged MSM/IDU and heterosexual/IDU networks
- #9 tested HIV- in early 2018

# Racism drives inequities in CS

Race/ethnicity of pregnant people associated with a CS case, Oregon 2014-2022





# Analysis of individual- and county-level predictors of CS, 2013-2021\*

- Among pregnant people with syphilis (N = 343), what factors are associated with being associated with a case of CS?
- Socio-ecological approach
  - Individual-level factors
    - ORPHEUS, or Oregon Public Health Epidemiologists' User System
    - Data gathered from case investigation
  - County-level factors
    - County Health Rankings
- Multilevel mixed effects random-intercept Poisson model with robust standard error estimation

# CS case classification

Criteria	N = 95
Maternal only	57 (60%)
Infant only	7 (7%)
Both maternal and infant	23 (24%)
Syphilitic stillbirth	8 (8%)

Maternal criteria



## Case classification

*Probable:* a condition affecting an infant whose mother had untreated or inadequately treated\* syphilis at delivery, regardless of signs in the infant, OR an infant or child who has a reactive non-treponemal test for syphilis (VDRL, RPR, or equivalent serologic methods) AND any one of the following:

- Any evidence of congenital syphilis on physical examination (see Clinical description).
- Any evidence of congenital syphilis on radiographs of long bones.
- A reactive CSF VDRL test.
- In a non-traumatic lumbar puncture, an elevated CSF leukocyte (white blood cell [WBC]) count or protein (without other cause):
  - Suggested parameters for abnormal CSF WBC and protein values:
    1. During the first 30 days of life, a CSF WBC count of >15 WBC/mm<sup>3</sup> or a CSF protein >120 mg/dL is abnormal.
    2. After the first 30 days of life, a CSF WBC count of >5 WBC mm<sup>3</sup> or a CSF protein >40 mg/dL, regardless of CSF serology.
  - The treating clinician should be consulted to interpret the CSF values for the specific patient.

Infant criteria



\* Adequate treatment is defined as completion of a penicillin-based regimen, in accordance with CDC treatment guidelines, appropriate for stage of infection, initiated 30 or more days before delivery.

*Confirmed:* a case that is laboratory confirmed.

# Individual-level variables

	All PP with syphilis (n=343)	No CS (n=248)	CS (n=95)
Age, years, median (IQR)	27 (22-31)	27 (23-31)	26 (22-32)
Race/ethnicity			
AI/AN	10 (3%)	6 (3%)	4 (4%)
Asian	8 (2%)	8 (3%)	0
Black	25 (8%)	20 (9%)	5 (5%)
Hispanic	65 (20%)	46 (20%)	19 (21%)
Multiple/other	20 (6%)	17 (7%)	3 (3%)
NH/PI	15 (5%)	10 (4%)	5 (5%)
white	181 (56%)	125 (54%)	56 (61%)
Rural or frontier zip code	80 (23%)	59 (24%)	21 (22%)
<b>Period 2019-2021 (v 2013-2018)</b>	<b>189 (55%)</b>	<b>130 (52%)</b>	<b>59 (62%)</b>

	All PP with syphilis (n=343)	No CS (n=248)	CS (n=95)
Syphilis stage and contacts			
Early syphilis	131 (38.2)	99 (39.9)	32 (33.7)
1+ contacts with a syphilis diagnosis	33 (9.6)	22 (8.9)	11 (11.6)
Substance use and corrections			
<b>Injection drug use, ever</b>	88 (25.7)	<b>47 (19.0)</b>	<b>41 (43.2)</b>
<b>Corrections involvement, ever</b>	149 (43.4)	<b>95 (38.3)</b>	<b>54 (56.8)</b>
<b>Partner uses injection drugs</b>	85 (24.8)	<b>53 (21.4)</b>	<b>32 (33.7)</b>
Prior STI, HCV			
Prior syphilis diagnosis	48 (14.0)	35 (13.1)	13 (13.7)
<b>GC diagnosis, prior 2 years</b>	31 (9.0)	<b>25 (10.1)</b>	<b>6 (6.3)</b>
CT diagnosis, prior 2 years	60 (17.5)	41 (16.5)	19 (20.0)
<b>HCV diagnosis prior to syphilis diagnosis</b>	20 (5.8)	<b>12 (4.8)</b>	<b>8 (8.4)</b>

# Injection drug use and corrections involvement increase the risk of being associated with a CS case

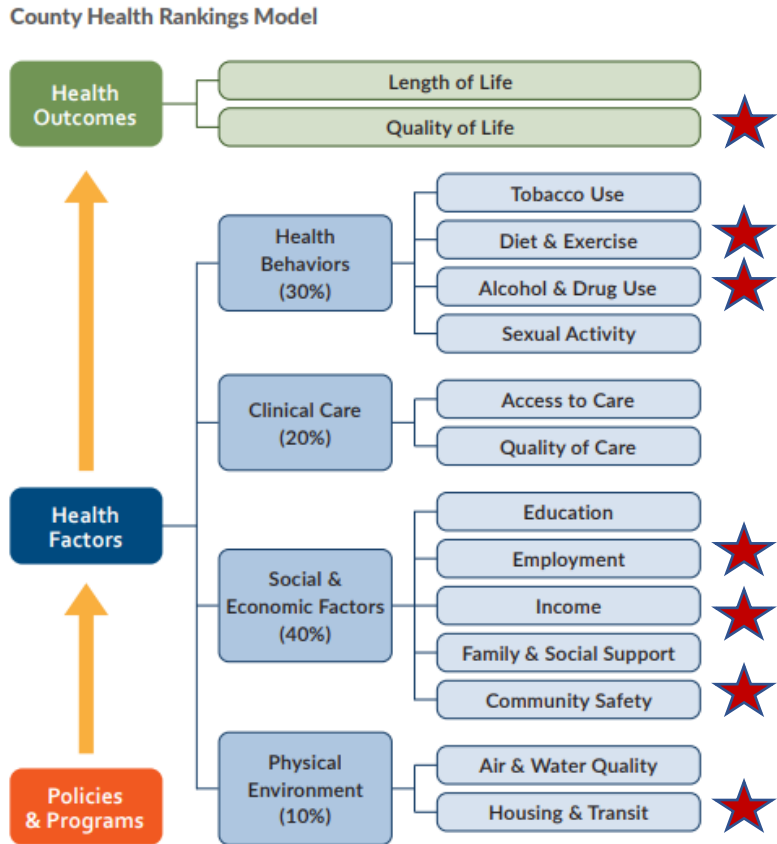
	Full model (all variables) RR (95%CI)	RR adjusted for age, race, time period (95%CI)
Injection drug use, ever	1.97 (1.22, 3.17)	1.92 (1.34, 2.78)
Corrections involvement, ever	1.45 (1.12, 1.89)	1.42 (1.11, 1.81)
GC diagnosis, prior 2 years	0.49 (0.30, 0.81)	0.51 (0.34, 0.76)

CI, confidence interval; GC, gonorrhea; RR, risk ratio

# Notes and limitations to the individual-level data

- Prenatal care variables are only available for pregnant people who were associated with a case of CS
- Housing status, transactional sex, more recent substance use had > 30% missingness
- Corrections data gathered from Accurint
  - Corrections involvement is defined as incarceration, community supervision, and/or outstanding cases or warrants (excluding for traffic violations)

# Selecting county-level metrics



County Health Rankings model © 2014 UWPHI

- Quality of life
  - Mental health
- Health behaviors
  - Food insecurity
  - Methamphetamine overdose
- Social and economic factors
  - Unemployment
  - Poverty, income inequality
  - Adverse childhood experiences
  - Violent crime
- Physical environment
  - Houselessness

# County-level variables

County-level metric	Source	Year
Average number of poor mental health days	BRFSS	2020
% food insecurity	Map the Meal Gap	2020
Methamphetamine overdose death rate	OHA Overdose Dashboard	2019
% unemployed	Bureau of Labor Statistics	2021
% population in poverty	ACS 5-Year Estimates	2017-2021
Income inequality ratio	ACS 5-Year Estimates	2017-2021
% population with at least 1 adverse childhood experience	BRFSS	2020
Violent crime rate	FBI Crime Data	2020
Houseless rate	Oregon PIT Count	2020



# County-level variables

County-level metric, median (IQR)	PP with syphilis (n = 343)	No CS (n = 248)	CS (n = 95)
Average poor mental health days	4.8 (4.7-5.1)	4.8 (4.7-5.1)	5.0 (4.7-5.1)
% food insecurity	12 (11-12)	12 (10-12)	12 (11-12)
Meth OD death rate (per 100K)	4.9 (3.1-11.1)	4.9 (2.1-11.1)	8.0 (3.1-11.1)
% unemployed	7.8 (6.9-8.6)	7.8 (6.9-8.6)	7.9 (7.2-8.6)
% population in poverty	13.2 (12.9-13.7)	13.3 (12.1-13.7)	13.2 (13.2-13.7)
Income inequality ratio	4.50 (4.02-4.88)	4.50 (4.02-4.81)	4.61 (4.12-4.88)
% population with at least 1 ACE	68.7 (65.3-71.3)	68.7 (65.3-70.6)	70.3 (65.3-71.3)
Violent crime rate (per 1K)	2.3 (1.7-3.5)	2.3 (1.7-3.3)	3.3 (2.2-4.7)
Houseless rate (per 1K)	0.36 (0.27, 0.47)	0.30 (0.23, 0.47)	0.47 (0.27, 0.47)

# County-level variables

County-level metric, median (IQR)	PP with syphilis (n = 343)	No CS (n = 248)	CS (n = 95)
Average poor mental health days	4.8 (4.7-5.1)	4.8 (4.7-5.1)	5.0 (4.7-5.1)
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Meth OD death rate (per 100K)	4.9 (3.1-11.1)	4.9 (2.1-11.1)	8.0 (3.1-11.1)
<b>% unemployed</b>	7.8 (6.9-8.6)	<b>7.8 (6.9-8.6)</b>	<b>7.9 (7.2-8.6)</b>
% population in poverty	13.2 (12.9-13.7)	13.3 (12.1-13.7)	13.2 (13.2-13.7)
<b>Income inequality ratio</b>	4.50 (4.02-4.88)	<b>4.50 (4.02-4.81)</b>	<b>4.61 (4.12-4.88)</b>
<b>% population with at least 1 ACE</b>	68.7 (65.3-71.3)	<b>68.7 (65.3-70.6)</b>	<b>70.3 (65.3-71.3)</b>
<b>Violent crime rate (per 1K)</b>	2.3 (1.7-3.5)	<b>2.3 (1.7-3.3)</b>	<b>3.3 (2.2-4.7)</b>
Houseless rate (per 1K)	0.36 (0.27, 0.47)	0.30 (0.23, 0.47)	0.47 (0.27, 0.47)

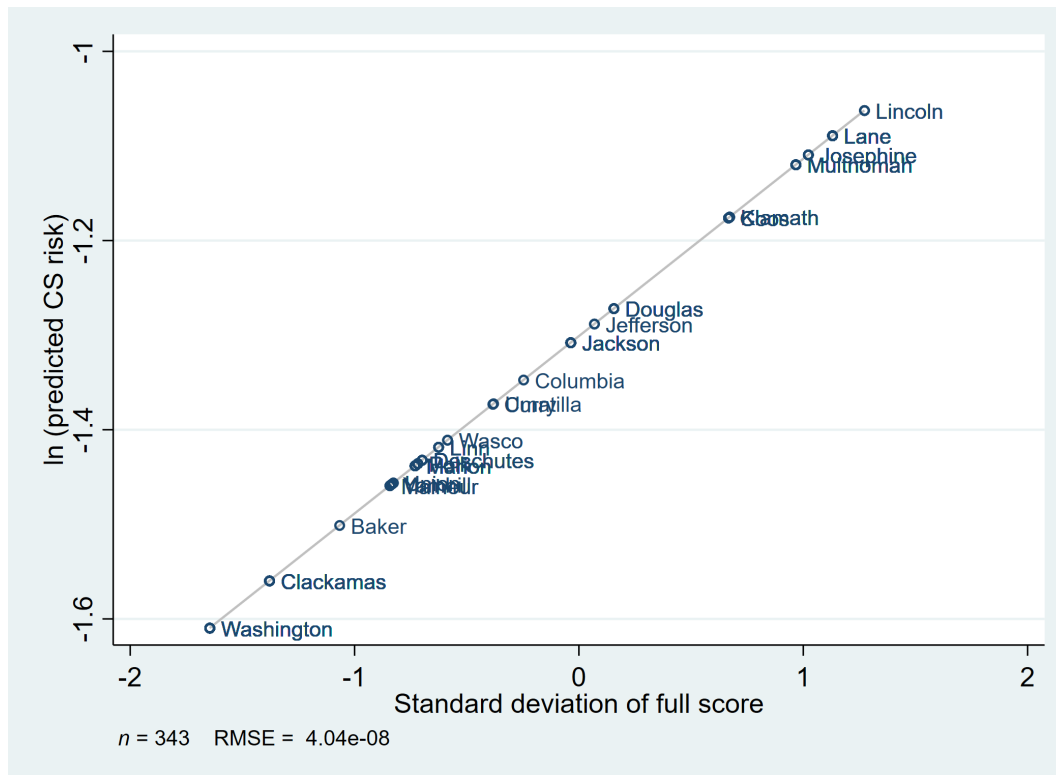
**Bolded metrics** are statistically significant in bivariable multilevel mixed effects Poisson models

# Principal component analysis

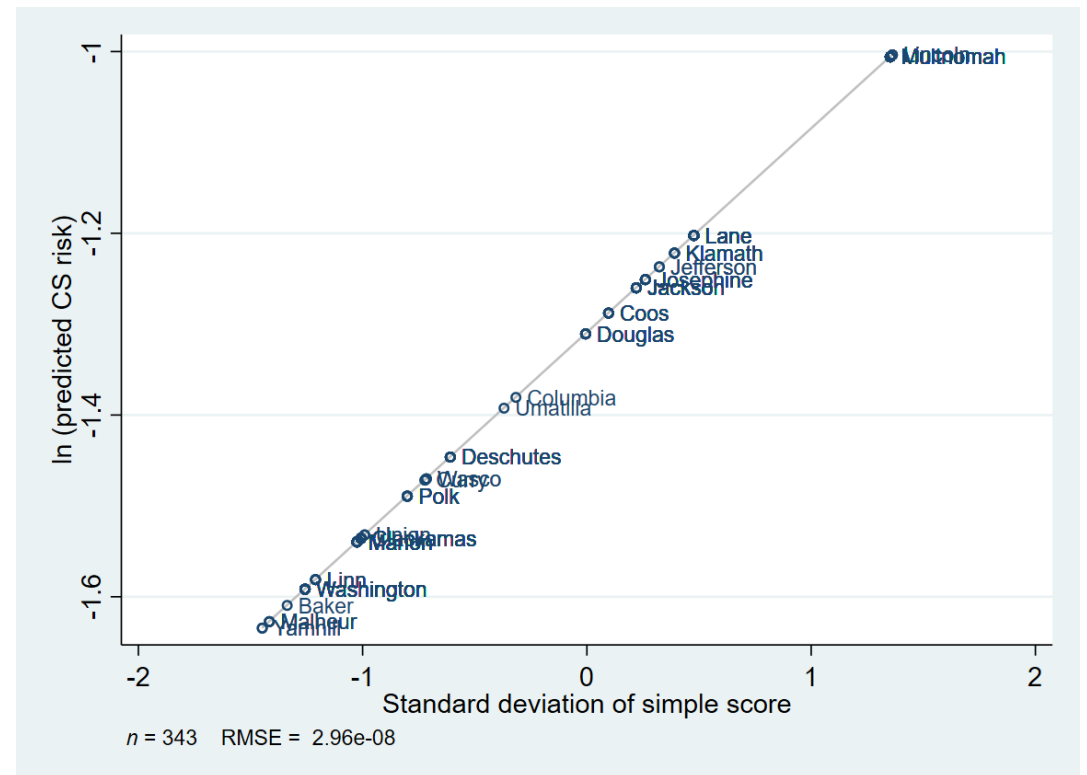
- All the county-level variables are highly positively correlated (0.33-0.90)
- And each variable may help explain some proportion of variance in the outcome of CS
- Therefore, we used principal component analysis to create a new variable, a score, that represents a linear combination of the county-level variables and that retains the explanatory variance of the original variables
- Using the first component of two PCA's, we calculated a full score (all variables) and simple score (statistically significant variables)
  - A higher score indicates higher rates or percentages of each of the original variables (county-level disadvantage)

# Counties with higher scores (greater disadvantage) are associated with greater CS risk

## Full score (all county-level variables)



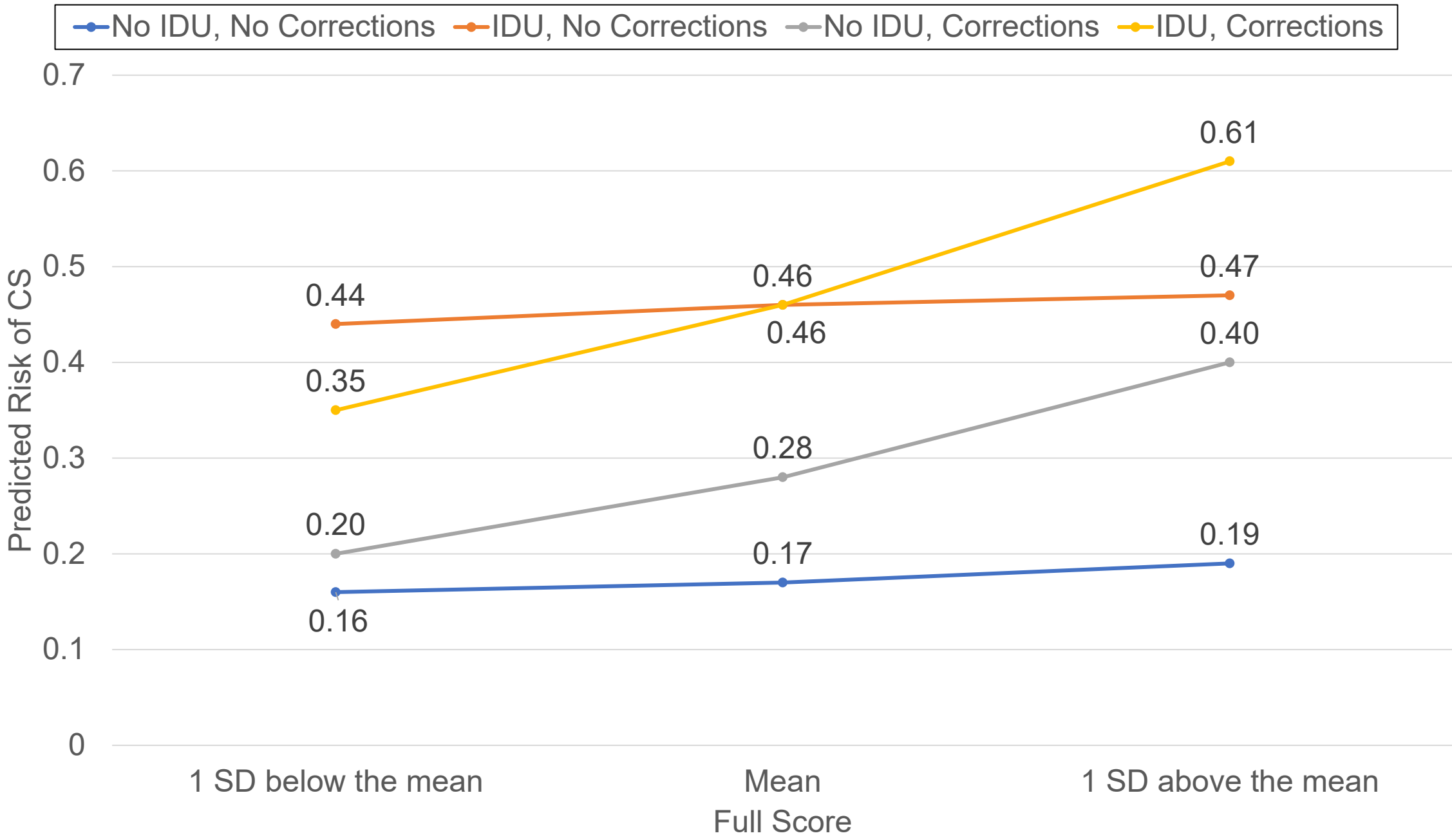
## Simple score (violent crime, income inequality, unemployment, ACEs)



# Multilevel mixed effects Poisson models that include county-level scores and individual-level variables

	Full bivariable RR (95%CI)	Full multivariable* RR (95%CI)	Simple bivariable RR (95%CI)	Simple multivariable* RR (95%CI)
SD (score)	1.21 (1.03, 1.41)	1.22 (1.04, 1.43)	1.25 (1.15, 1.36)	1.26 (1.12, 1.42)
Injection drug use, ever		1.88 (1.32, 2.68)		1.84 (1.28, 2.64)
Corrections involvement, ever		1.43 (1.10, 1.87)		1.38 (1.07, 1.80)
GC diagnosis, prior 2 years		0.50 (0.32, 0.77)		0.49 (0.32, 0.74)

Multivariable models also include age, race, time period  
 CI, confidence interval; GC, gonorrhea; RR, risk ratio



# Limitations and analytic next steps

- Overall, relatively small number of counties ( $n = 23$ ) with a range of pregnant people with syphilis from 1 to 85
  - Time periods represented in county-level variables
  - Interpretation of the score (full v. simple)
- 
- Expand the time periods of county-level variables
  - Explore mediators, including metrics of social capital, community resilience

# Finding and leveraging touchpoints for prevention

**Q.** **PP use of services**

People may access many other services during their pregnancy, did you use any of the following services during your most recent pregnancy?

↔

**A.**

WIC - Special Supplemental Nutrition Program	Visits from homeless services and outreach sta
Visiting nurse program	Services offered by cultural/religious
Homeless shelter	Service for domestic violence survivors
Syringe service program	Other
Peer support program for pregnant person	
Peer support program for persons who use	
Peer support program for persons with mental	
Individual counseling	
Group counseling	
Food bank	

**Notes**

**Q.** **PP received resources**

What if any of the following resources did you receive during your most recent pregnancy?

↔

**A.**

SNAP - Supplemental Nutrition Assistant Program,	
SSI - Supplemental Security Income	
Social Security	
HCV - Housing Choice Voucher program, section	
Public Housing	
Unemployment	
TANF - Temporary Assistance for Needy Families	
Not Applicable	
Other	

**Notes**



# Expanding the reach of CS prevention

- STD 340B ODOC partnership and expansion of current STD 340B local jail partnerships to encourage opt-out screening and treatment for HIV, STI, viral hepatitis
  - OR correctional health HIV/STI/hepatitis community of practice forthcoming
- Promotion of opt-out HIV, syphilis, and viral hepatitis testing in emergency departments and SUD treatment/peer programs with a focus on pregnant people (all visits are prenatal care visits!)

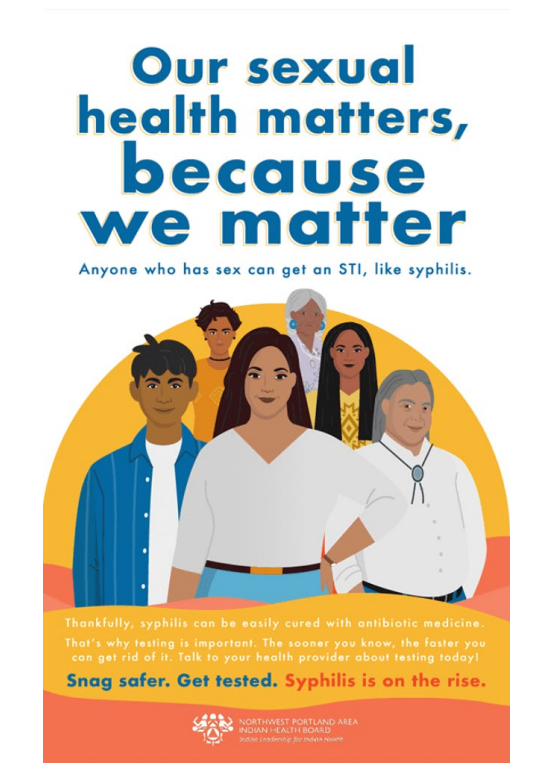
# Expanding the reach of CS prevention

- Street medicine partnerships for education, testing, and treatment
- Expansion of low barrier treponemal testing (DBS, rapid syphilis testing)
  - Sites (e.g., SSP, WIC, food banks, community supervision, housing programs)
  - Providers (e.g., doulas, visiting nurses, probation/parole officers, harm reduction peers, CHWs)



# Supporting patients

- Incentive program for patients and partners
- Special needs funding for motel vouchers, gas, transportation, transit passes, and to address other social determinants of health during syphilis treatment
- Low-barrier prenatal care programs with a focus on harm reduction and trauma-informed care, including mobile sites, pop-up venues, co-location with CBOs
- Field testing and treatment
- Community-engaged education and messaging



# Addressing poverty

- Medicaid 1115 waiver to address social determinants of health for members (starting 2024)
  - People experiencing housing instability and being released from correctional settings
- Integrate education about sexual health and syphilis for pregnant people accessing anti-poverty programs (e.g., WIC, food banks, SNAP, TANF)
- Abundant Birth Project: California model of universal basic income for Pacific Islander and Black pregnant people to reduce inequities in maternal and infant outcomes



# Thank you!

- Amy Zlot, MPH
- Yuritzzy Gonzalez-Peña, MPH
- Jillian Garai, RN, MPH
- Cedric Cicognani