

DATA INFORMING ACTION

Sexually Transmitted Diseases in Arizona

July 27th, 2016

AZID 2016 | Black Canyon Conference Center

Ryan Kreisberg, MPH | Epidemiologist



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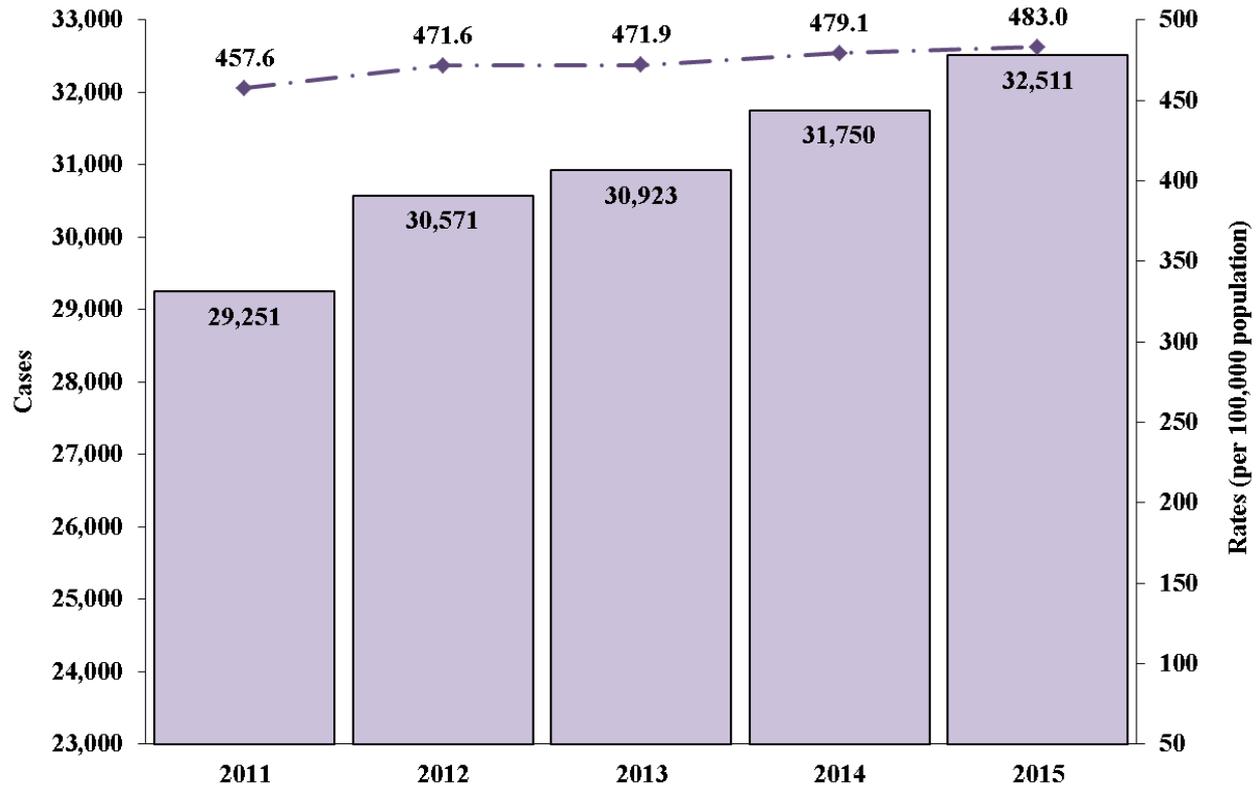
Agenda

- Current state of STDs in AZ
- Four examples of STD data analysis



Chlamydia

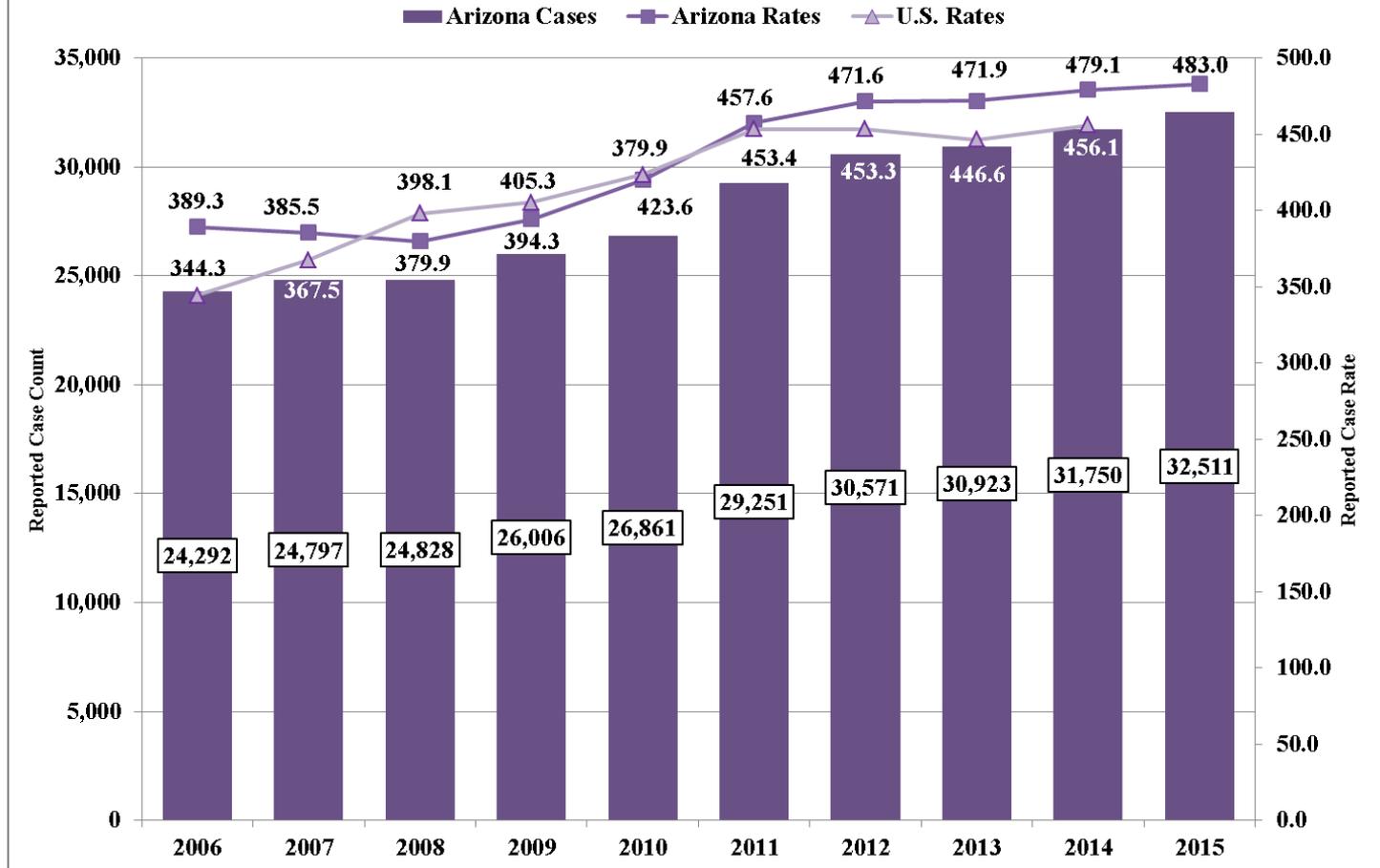
Reported Chlamydia Cases and Case Rates,
Arizona 2011-2015



Data is provisional and subject to change.

* 2014 CDC bridged data used for 2015 case rate population denominators.

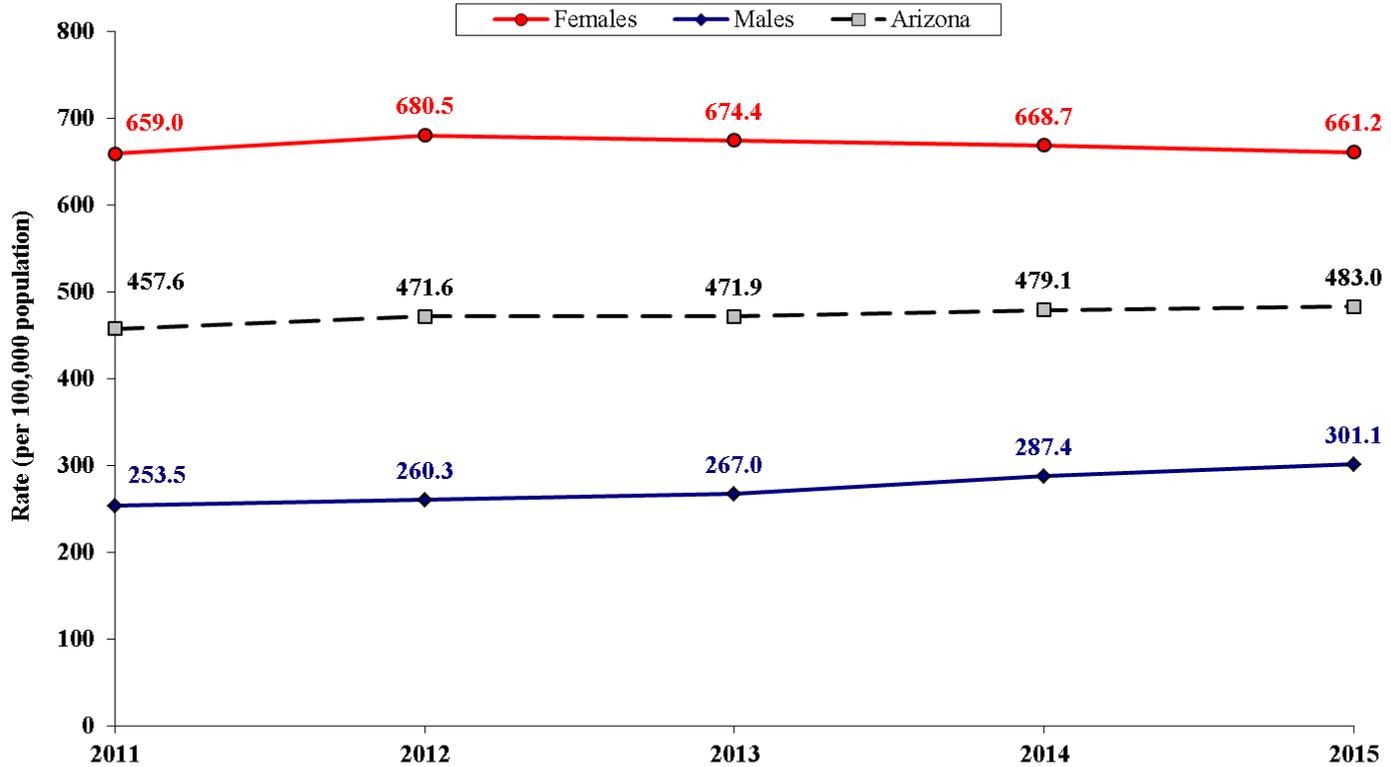
Comparison of 10 Year Reported Chlamydia Rates for Arizona and the United States, 2006-2015



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Reported Chlamydia Case Rates by Gender, Arizona 2011-2015



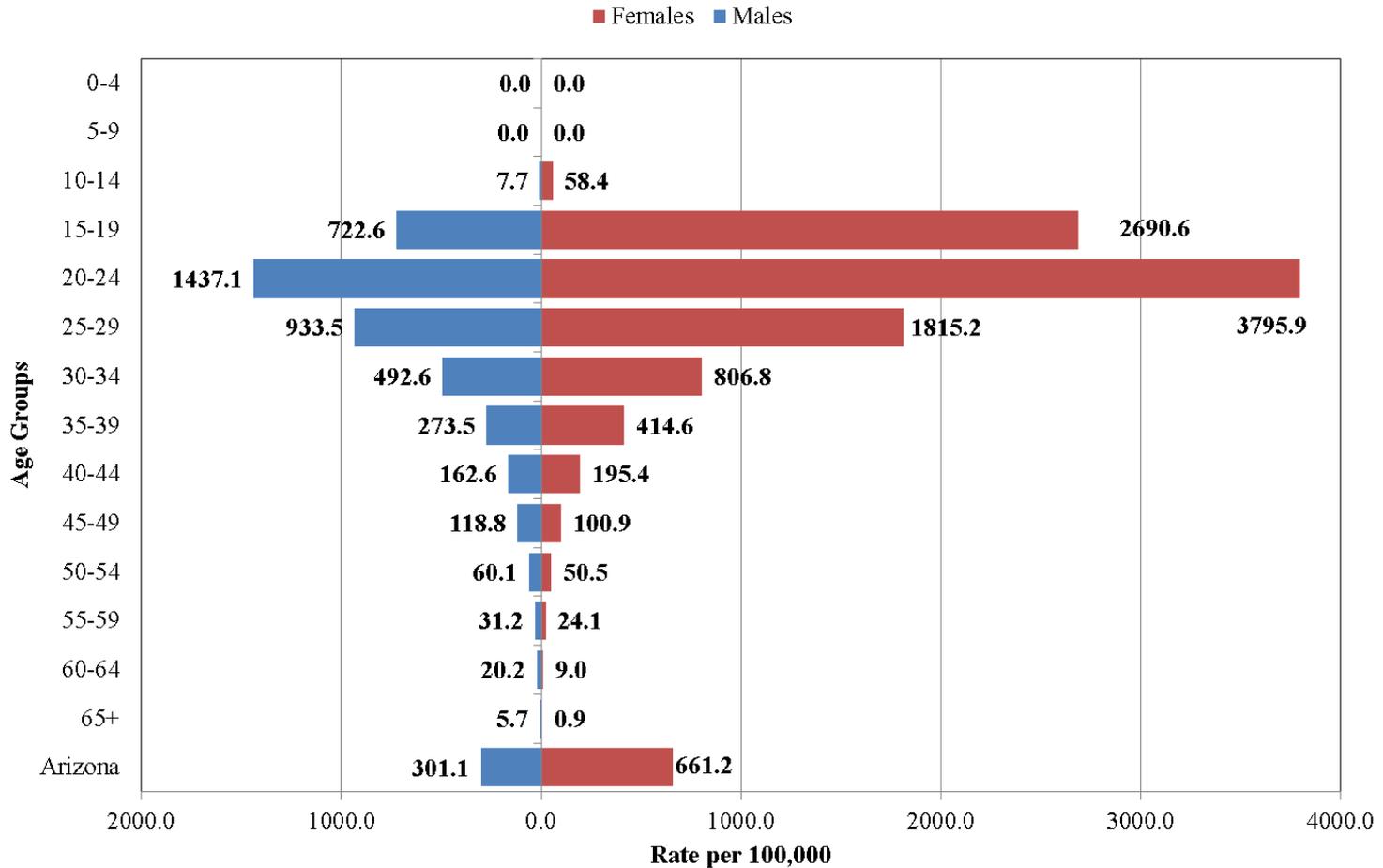
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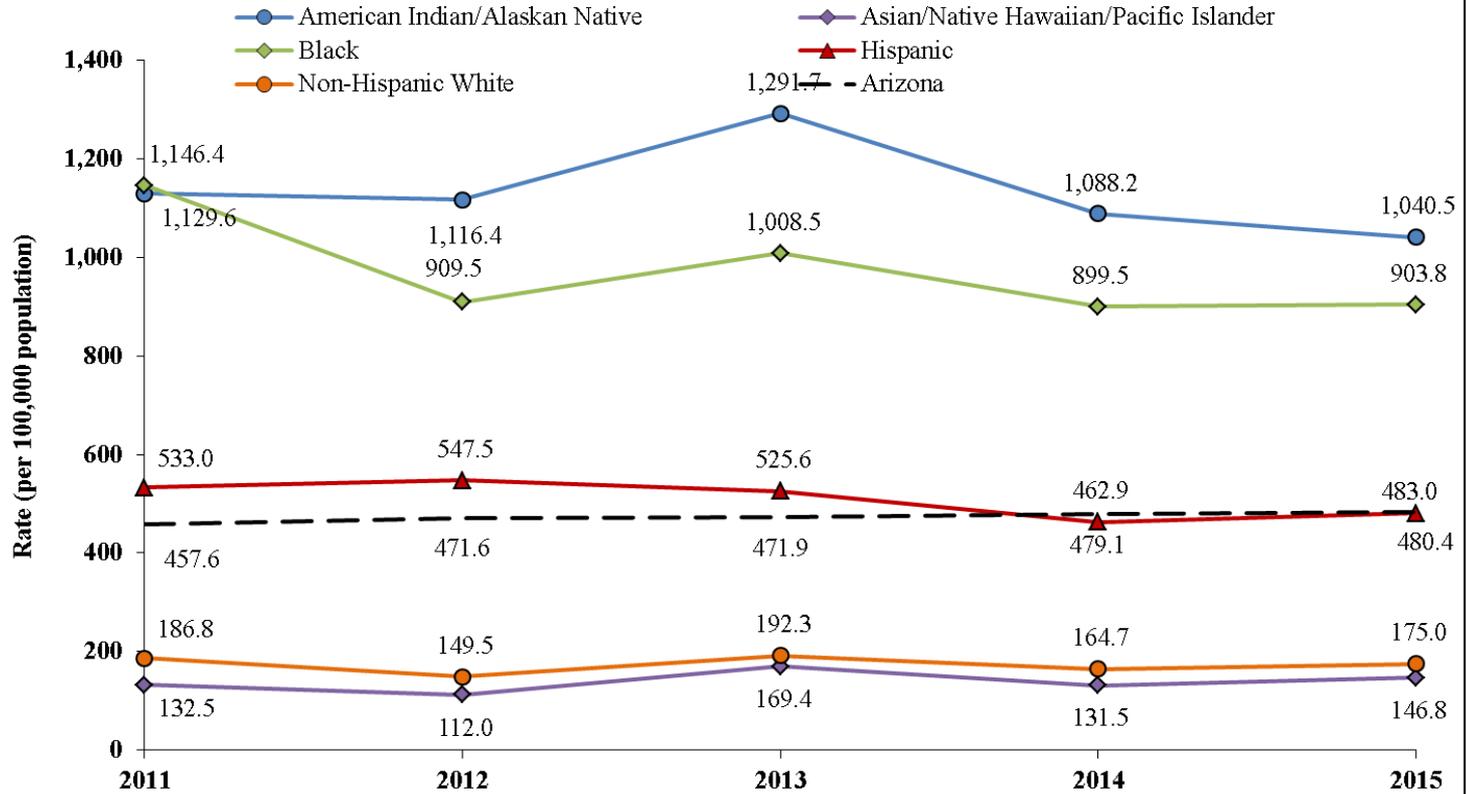
Chlamydia Rates by Age group and Gender, Arizona 2015



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Reported Chlamydia Case Rates by Race/Ethnicity, Arizona 2011-2015



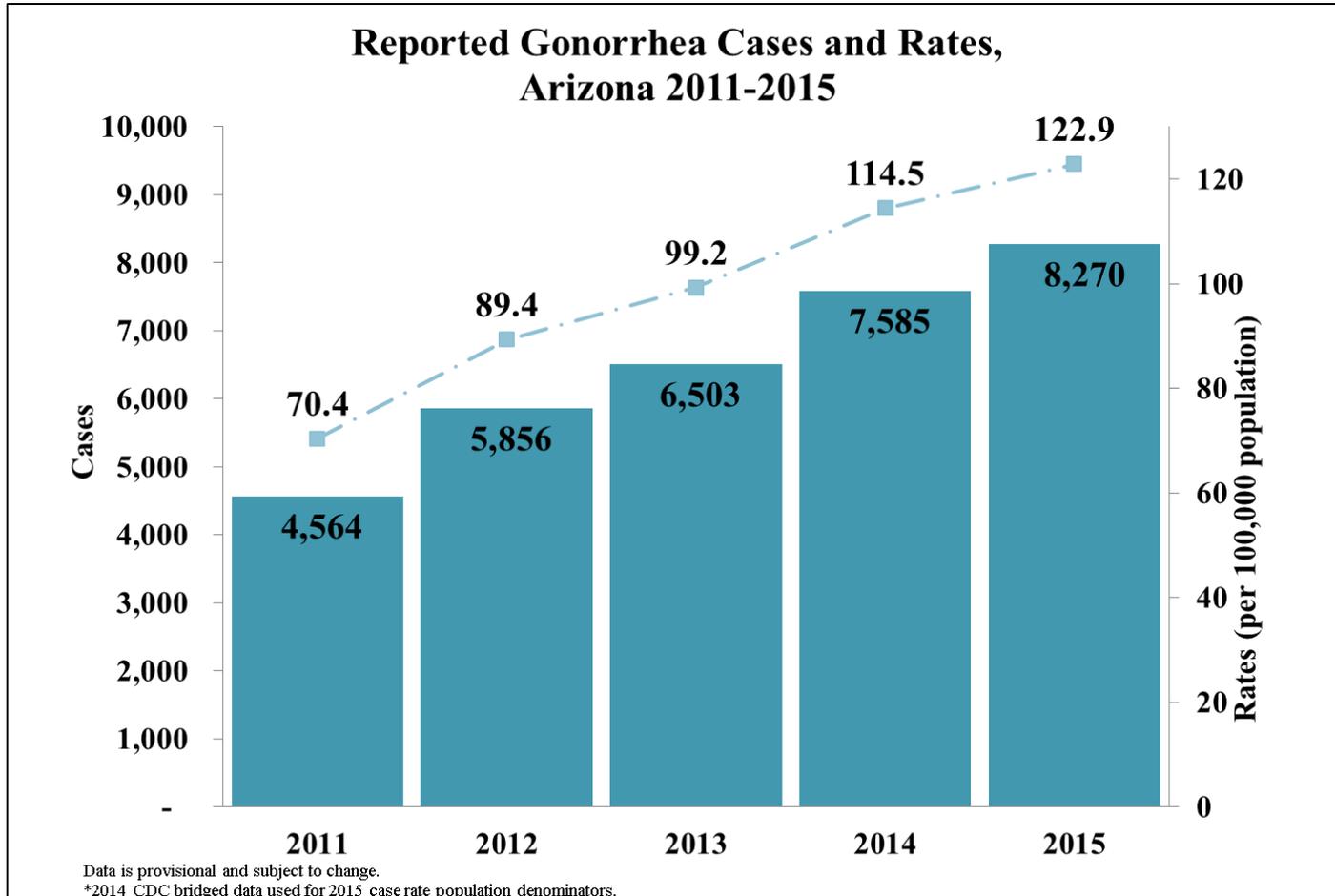
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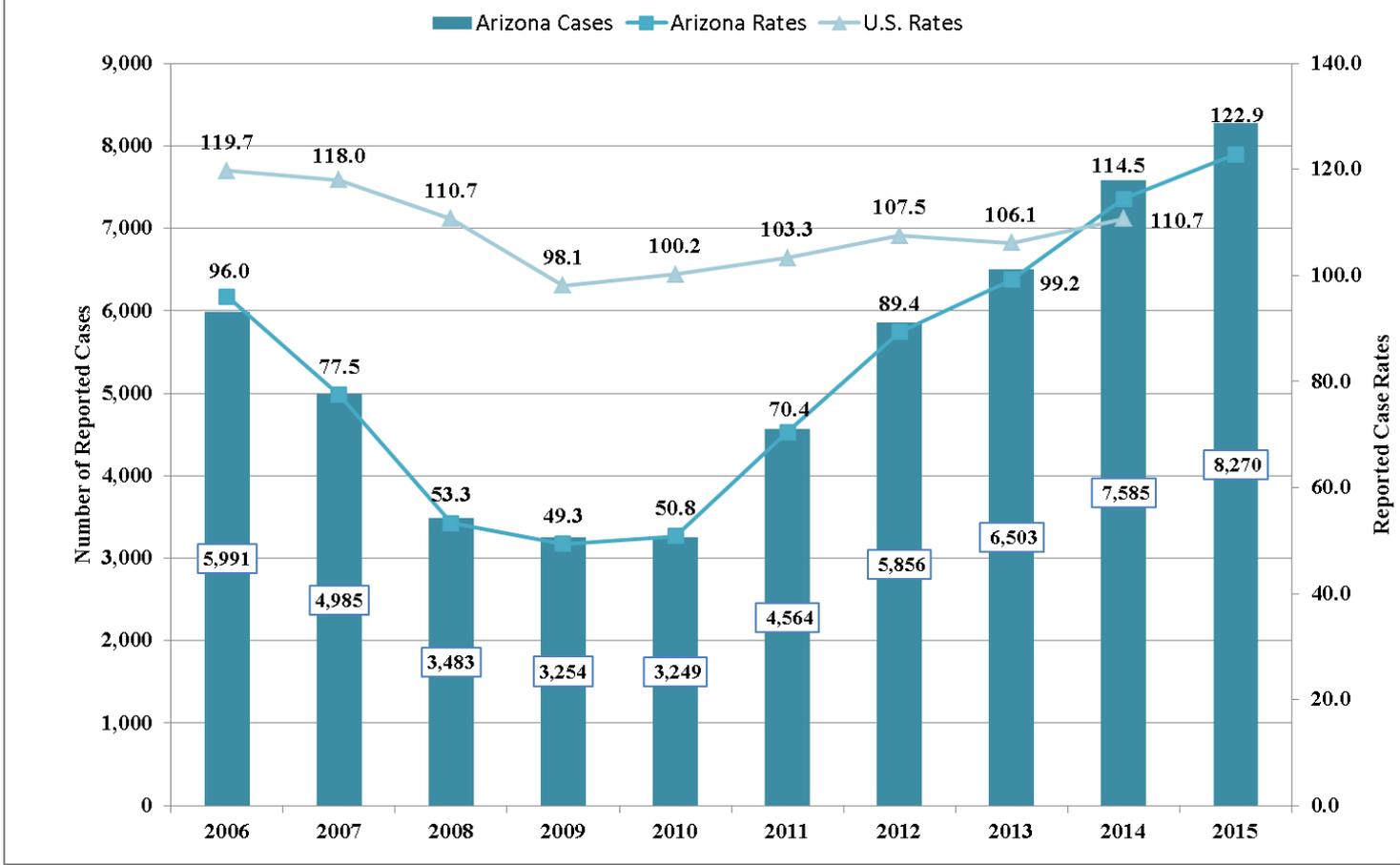
Gonorrhea



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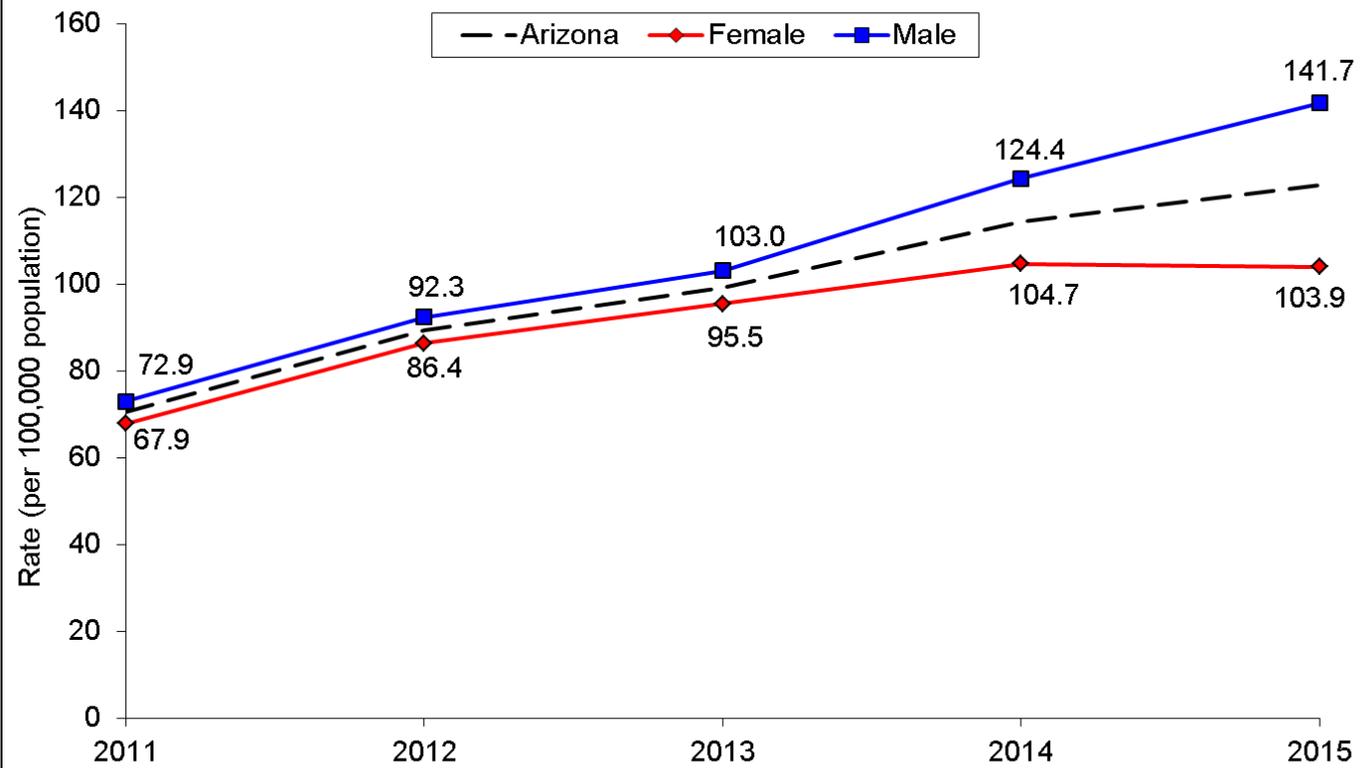
Comparison of 10 Year Reported Gonorrhea Rates for Arizona and the United States, 2006-2015



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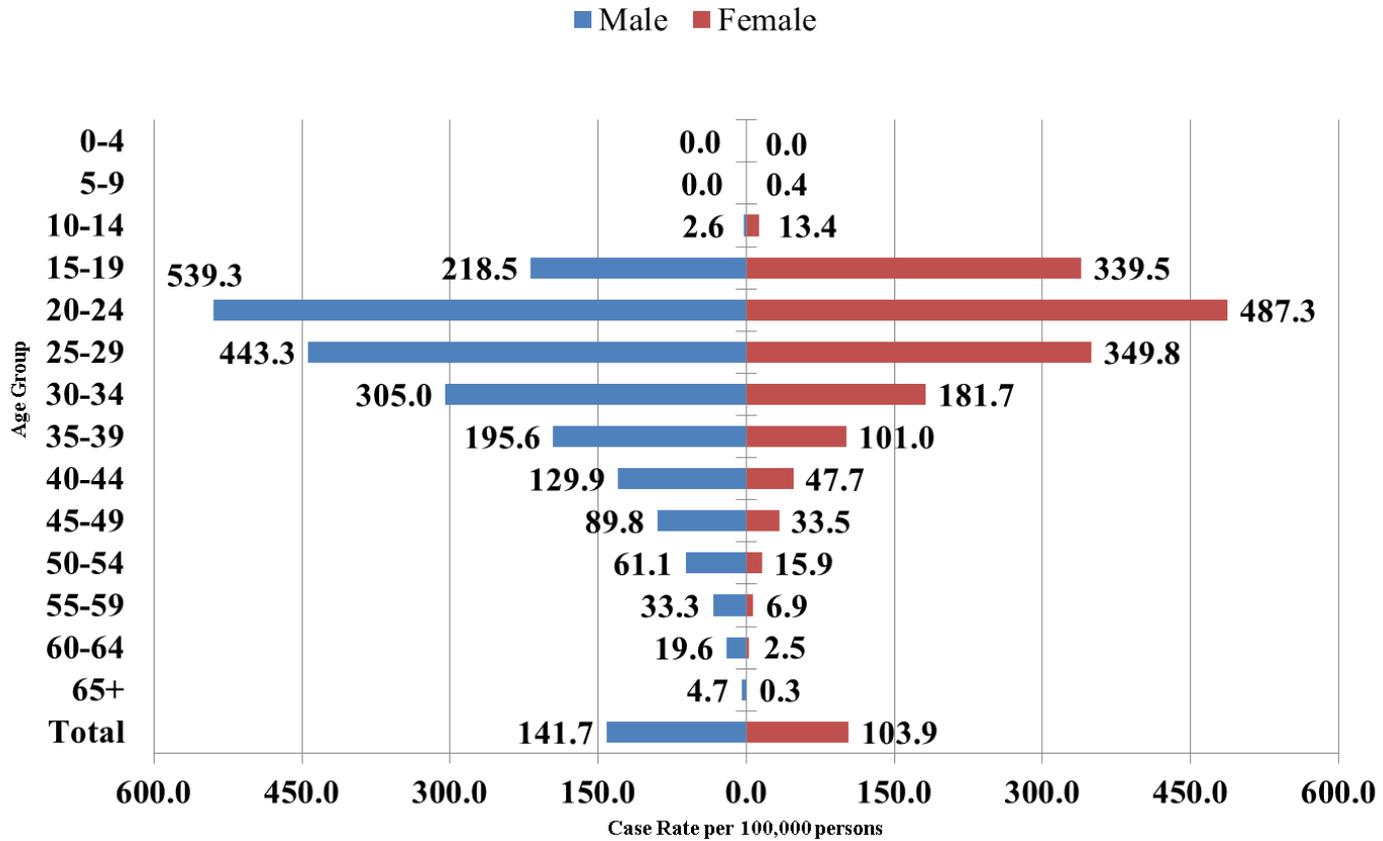
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Reported Gonorrhea Case Rates per 100,000 Population by Gender, Arizona 2011-2015



Data is provisional and subject to change.
*2014 CDC bridged data used for 2015 case rate population denominators.

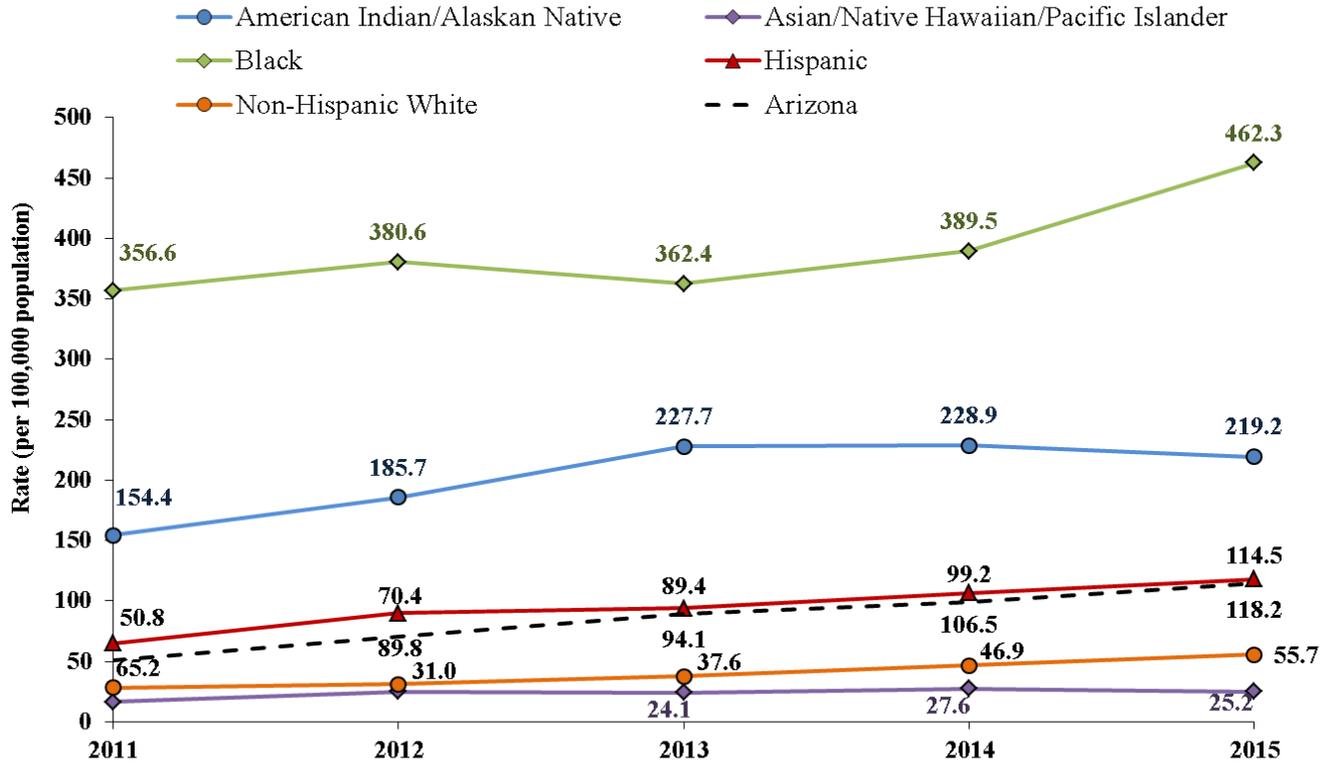
Gonorrhea Rates by Age Group and Gender, Arizona 2015



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Reported Gonorrhea Case Rates by Race/Ethnicity, Arizona 2011-2015



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Repeat Infections

Repeat GC Infections

7525 single infections
330 with 2 infections
28 with 3 or more

Repeat CT Infections

30883 single infections
1376 with 2 infections
84 with 3 or more

2475 Co-Infections
with CT and GC



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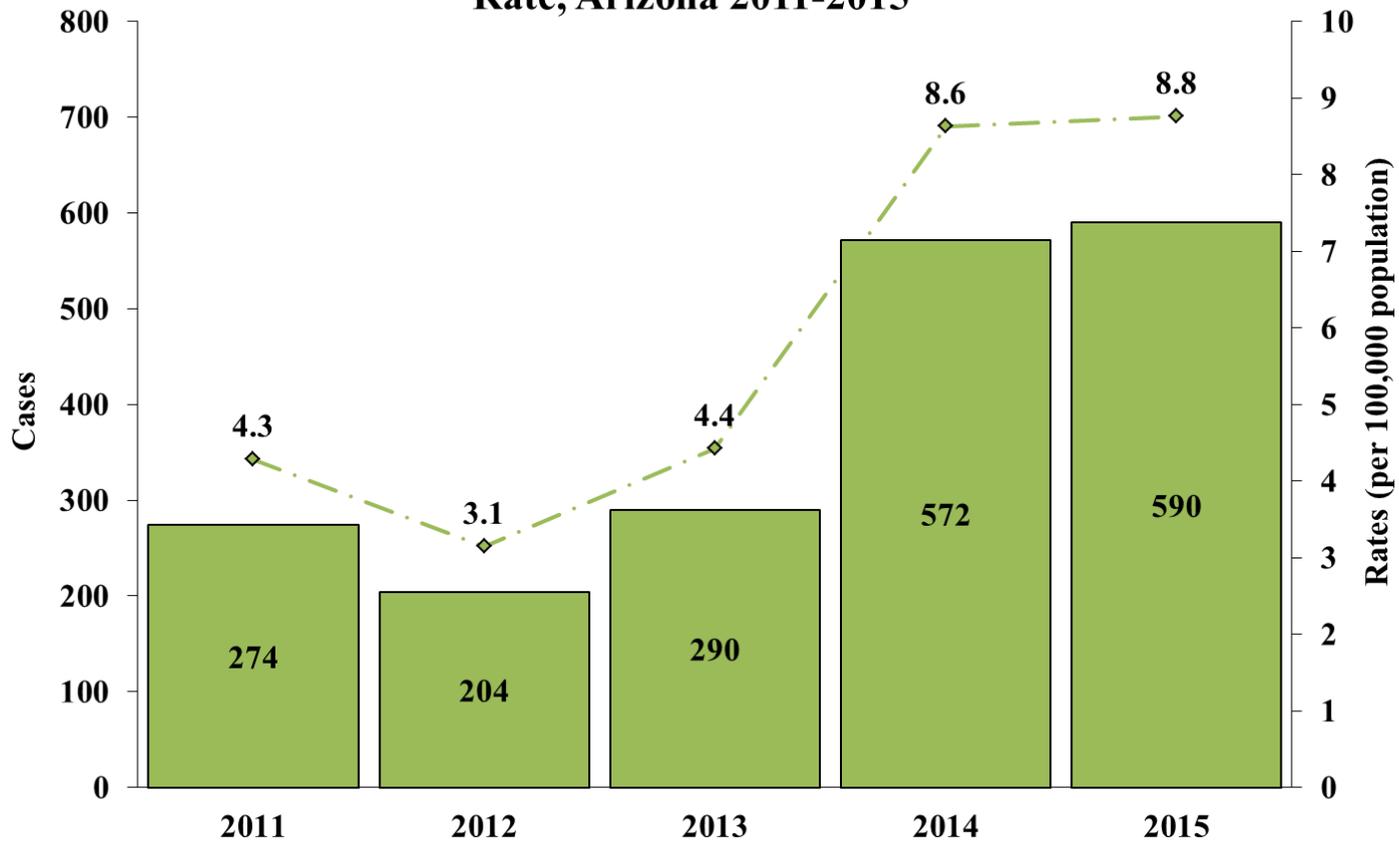
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Gonorrhea Resistance

- Resistance plan available on the AZDHS STD Control web page
- Recommended treatment:
250mg Ceftriaxone IM
AND
1gm Azithromycin Orally for 1 Dose

Primary/Secondary Syphilis

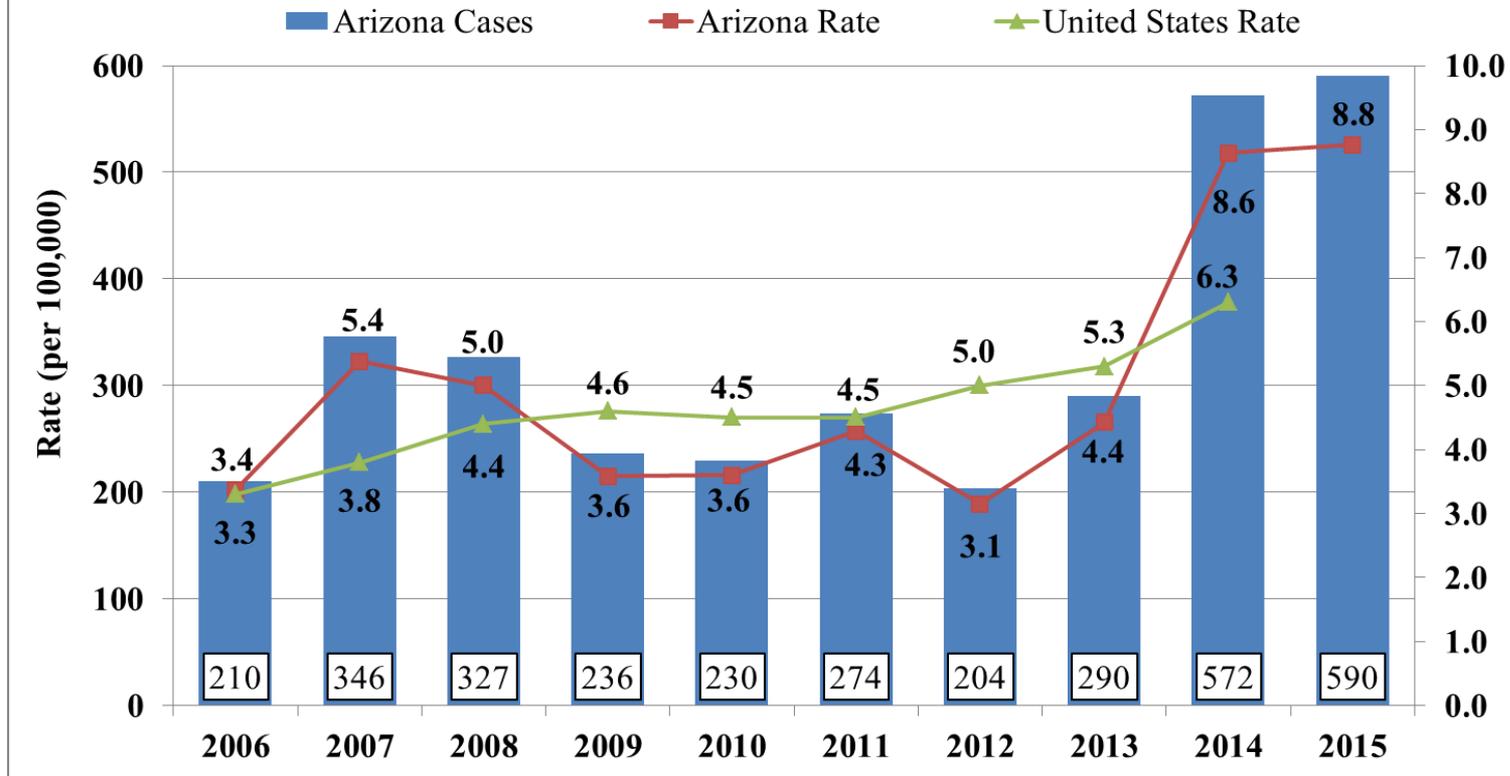
Reported Primary and Secondary Syphilis Cases and Case Rate, Arizona 2011-2015



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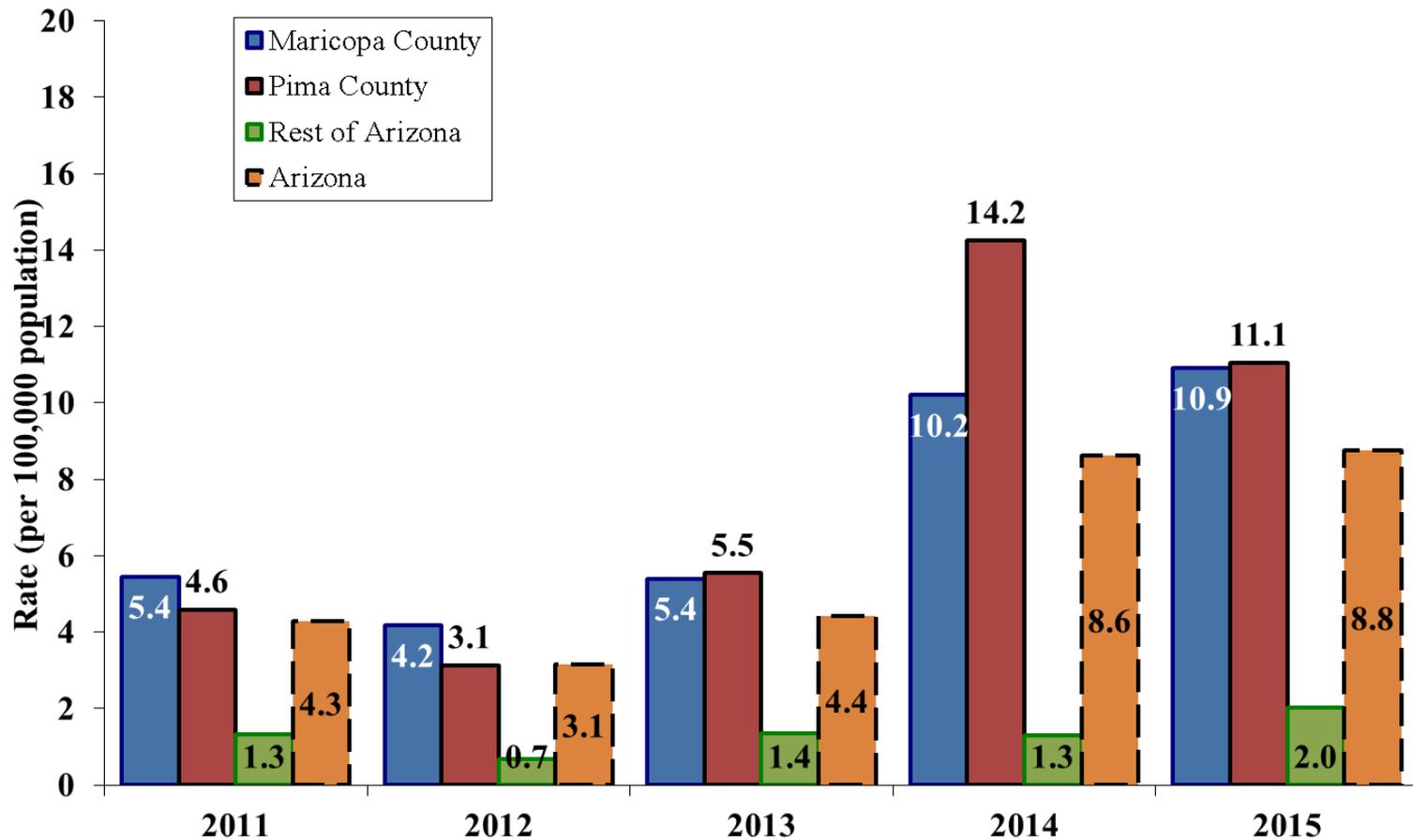
Reported Primary and Secondary Syphilis Case Rate United States and Arizona 2006 - 2015



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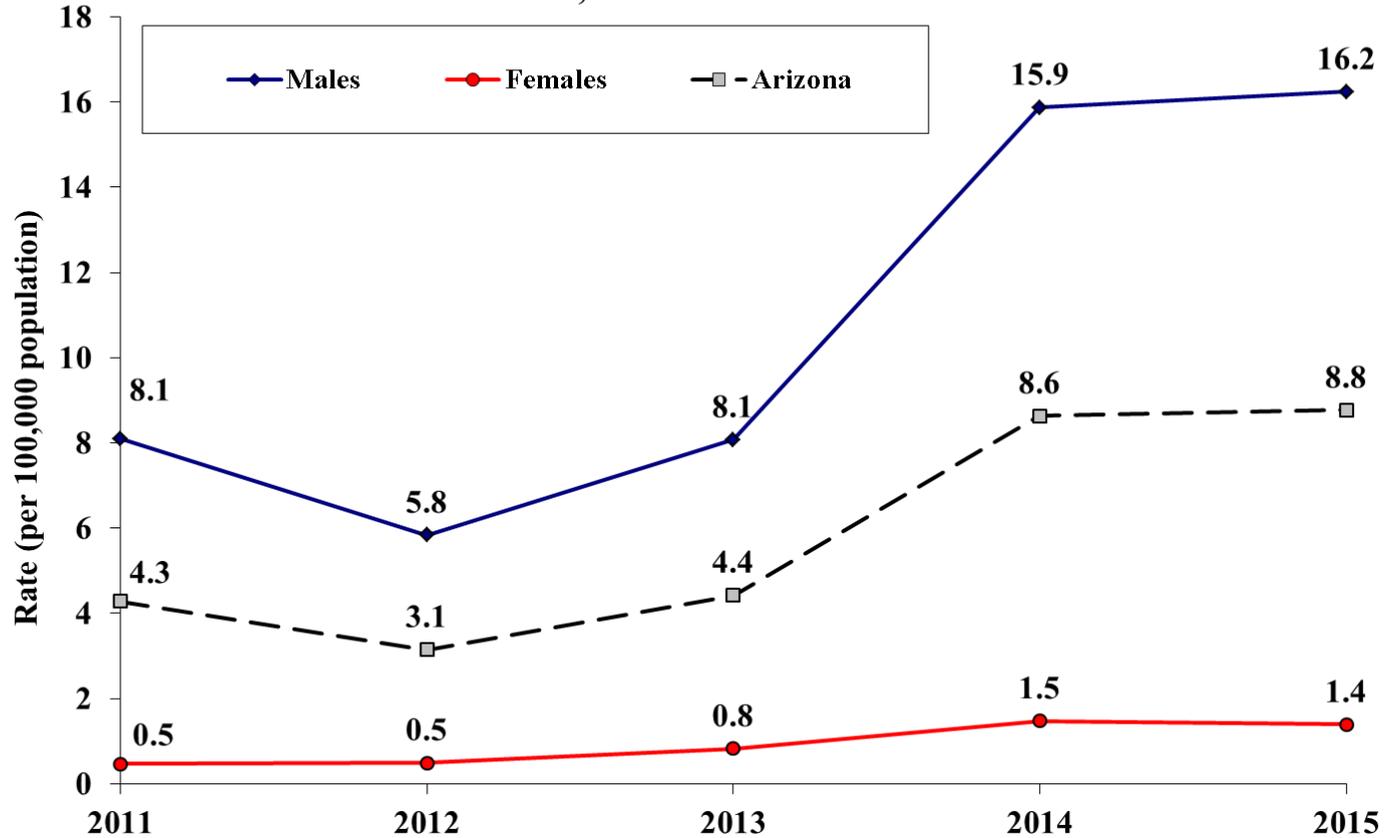
Reported Primary and Secondary Syphilis Case Rates by County of Residence, Arizona 2011 - 2015



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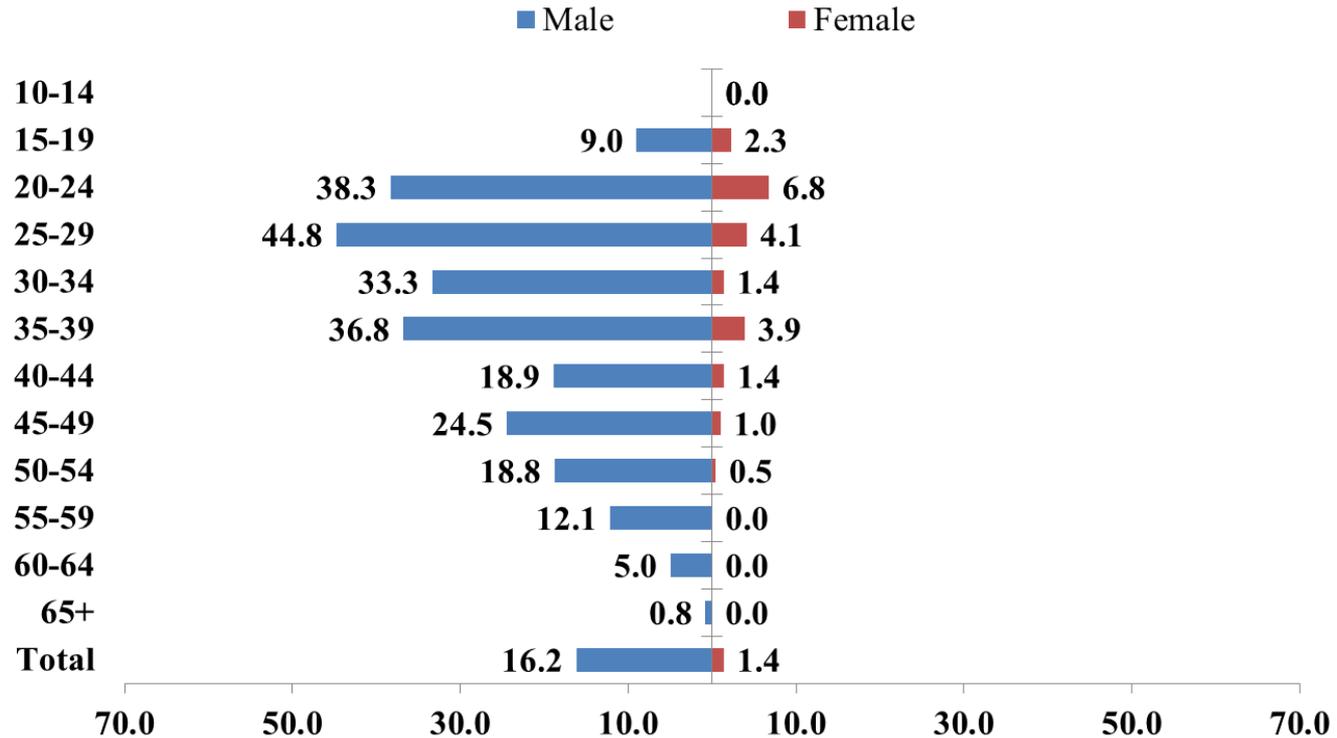
Reported Primary and Secondary Syphilis Case Rates by Gender, Arizona 2010-2015



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Rates of Primary and Secondary Syphilis by Age Group and Gender, Arizona 2015



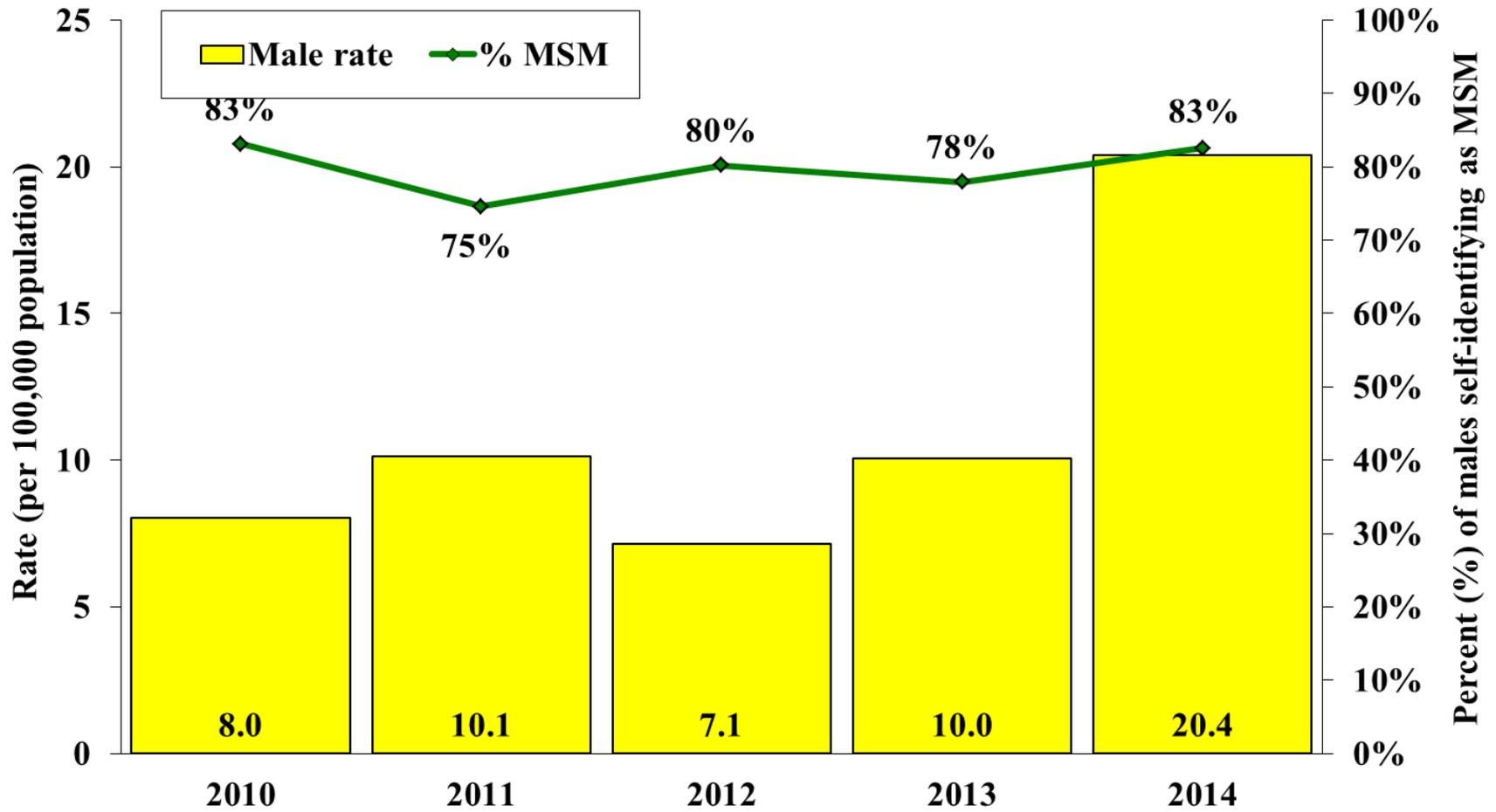
*Ages 0-9 not shown, Arizona rate reflects all ages.



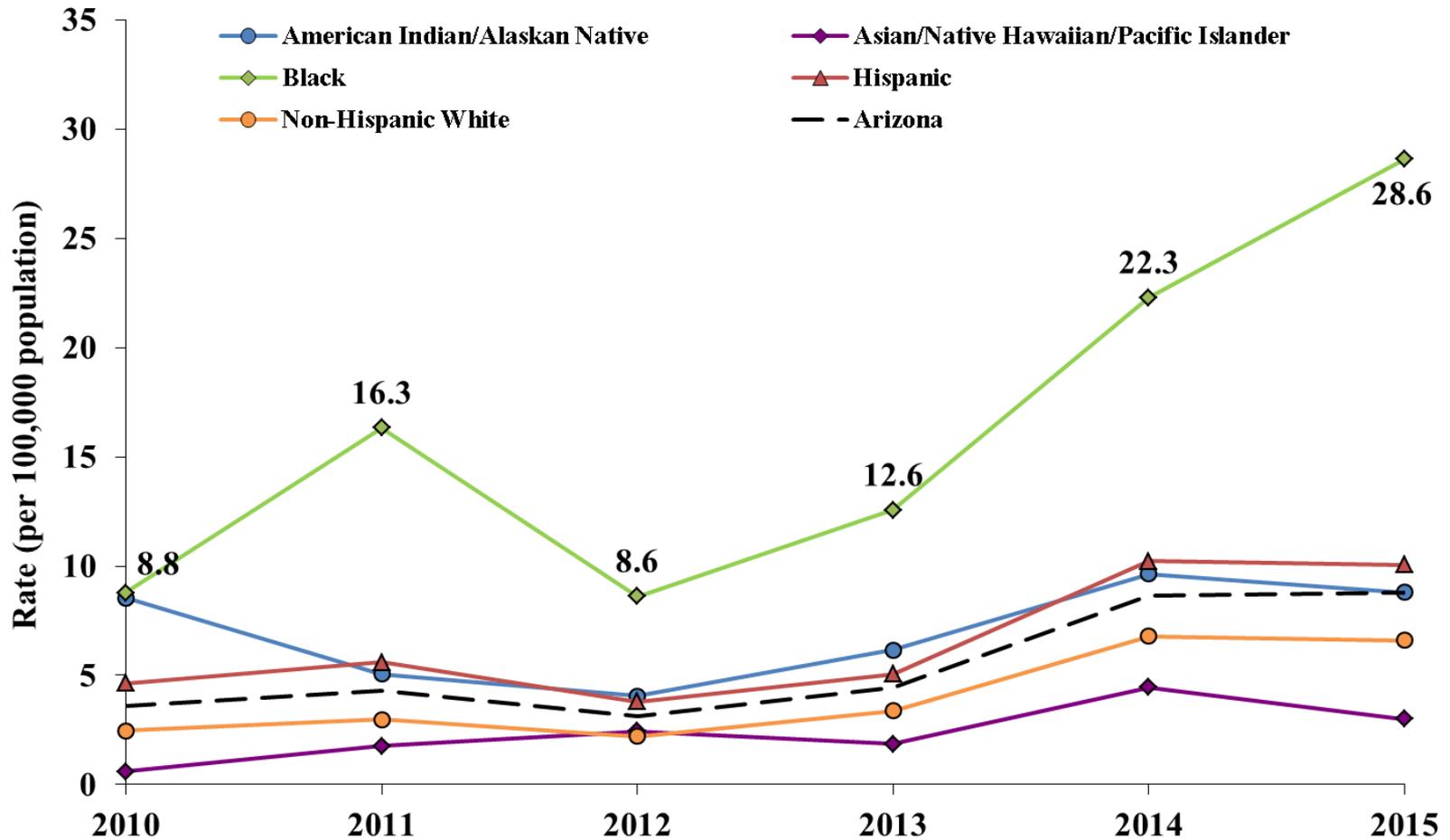
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Figure S7. Reported Rate of Primary and Secondary Syphilis Cases among Males and the Percentage of Male Cases that Self-Identify as Men who Have Sex with Men (MSM), Maricopa and Pima Counties, 2010-2014



Reported Primary and Secondary Syphilis Case Rates by Race/ Ethnicity, Arizona 2010 - 2015



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CONGENITAL SYPHILIS



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Surveillance Definition

- Stillbirths and infants with clinical evidence of CS
- Stillbirths and infants born to mothers with untreated or inadequately treated syphilis, regardless of the infant's manifestation of clinical disease.
- Maternal treatment was considered inadequate if it was initiated too late (<30 days before delivery), if a nonpenicillin therapy was administered, or if the dose of penicillin administered was inadequate for the mother's stage of syphilis.



National Trends

- 2008 – 2012:
 - Congenital Syphilis decreased from 10.5 to 8.4 cases / 100,000 live births
 - 446 to 334 Cases (-25.1%)
 - Lowest rate since 2005
 - Primary and Secondary in women decreased from 1.5 to 0.9 cases per 100,000 (-40%)



National Trends

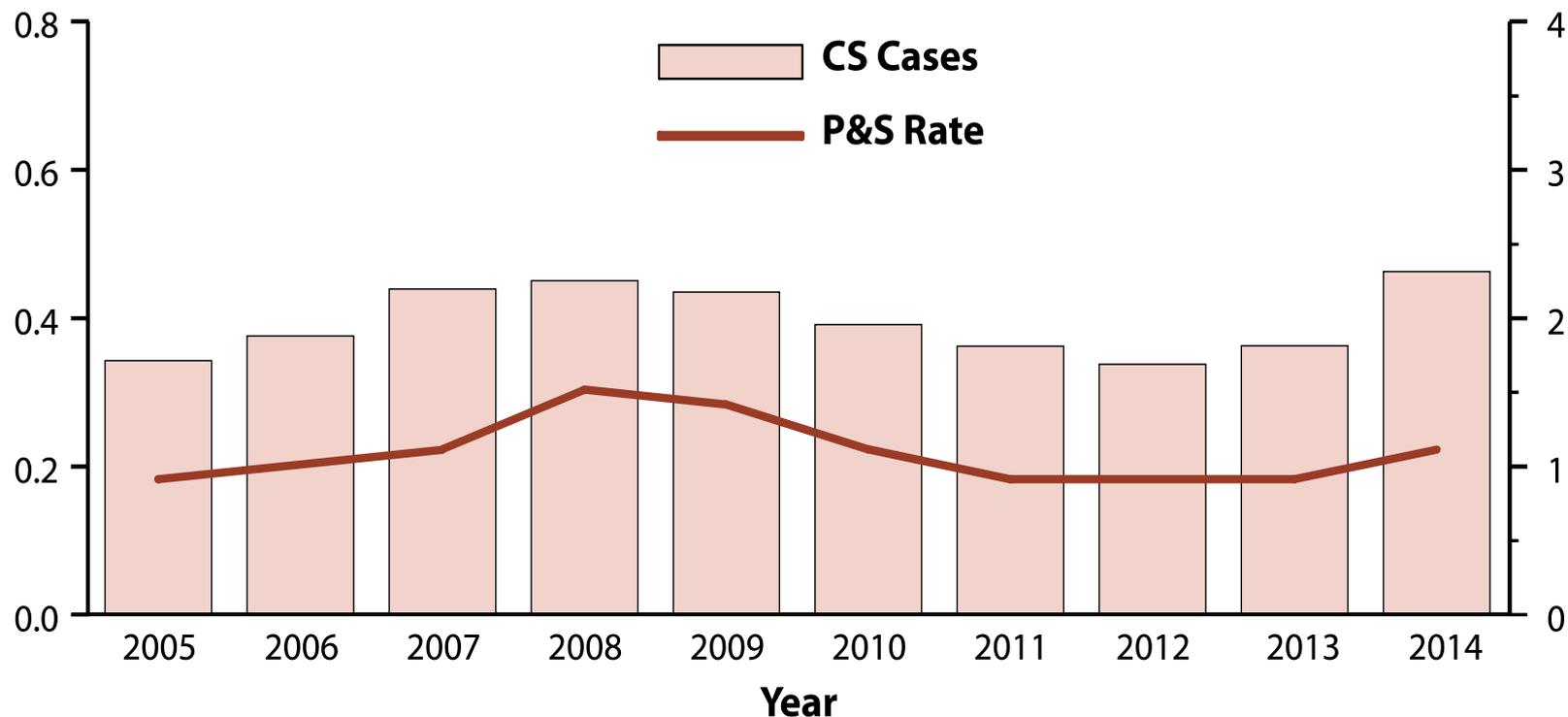
- 2013 - 2014:
 - Congenital Syphilis increased from 8.4 to 11.6 cases per 100,000 live births
 - 334 to 458 cases: 38% increase
 - Highest rate since 2001
 - Primary and Secondary Syphilis increased 22.2% among women



Congenital Syphilis – Reported Cases by Year of Birth and Rates of Primary and Secondary Syphilis Among Women, United States, 2005–2014

CS* cases (in thousands)

P&S* rate (per 100,000 women)

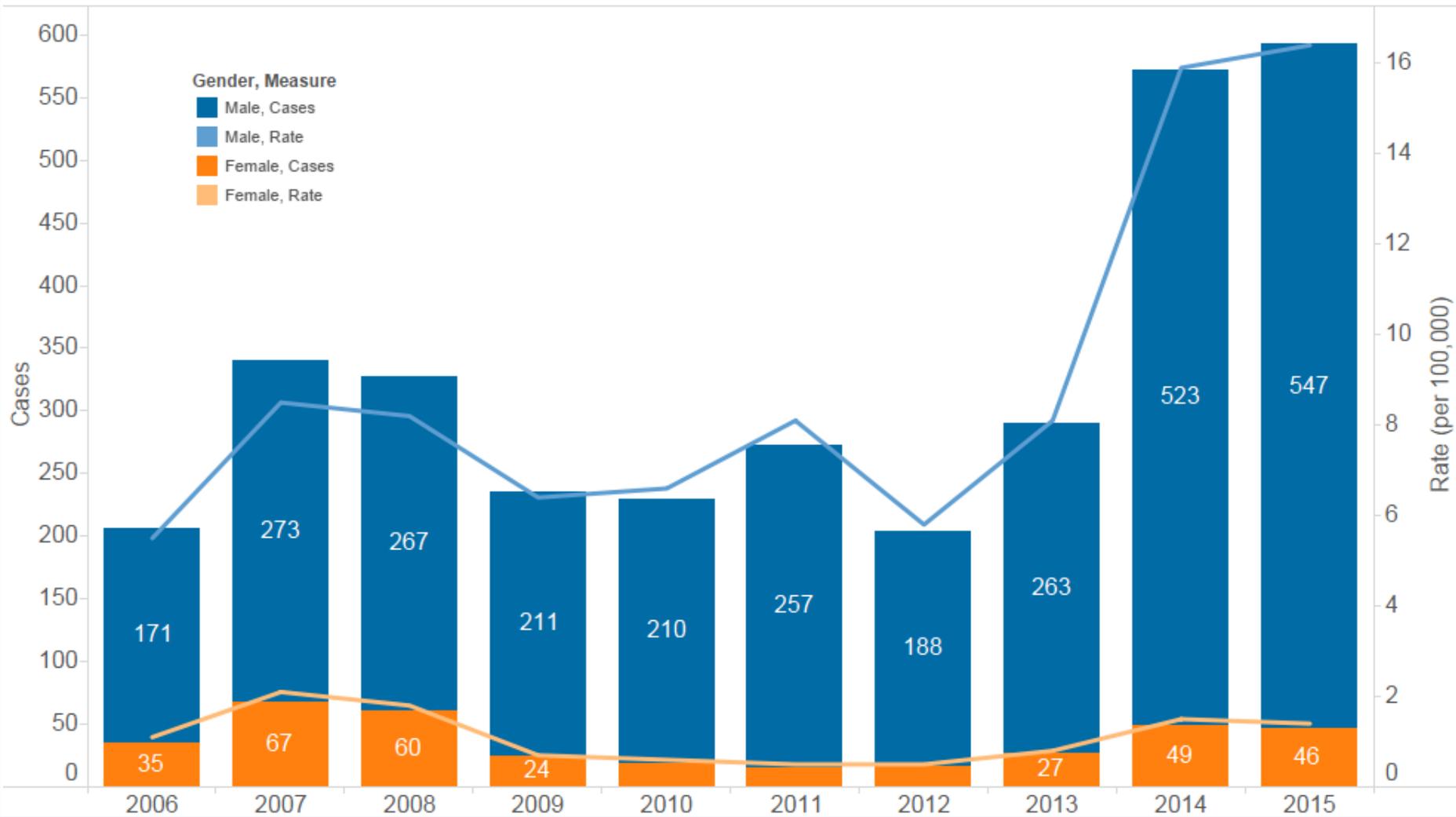


* CS=congenital syphilis; P&S=primary and secondary syphilis.



Arizona Male and Female Rates

Male and Female Syphilis Cases and Rates 2006-2015



Arizona Trends

- 2008 – 2012:
 - Congenital Syphilis decreased from 44.3 to 16.3 cases / 100,000 live births
 - 44 to 14 Cases (-68.2%)
 - Primary and Secondary Syphilis in women decreased from 1.8 to 0.5 cases / 100,000 live births
 - 60 to 16 cases (-73.3%)

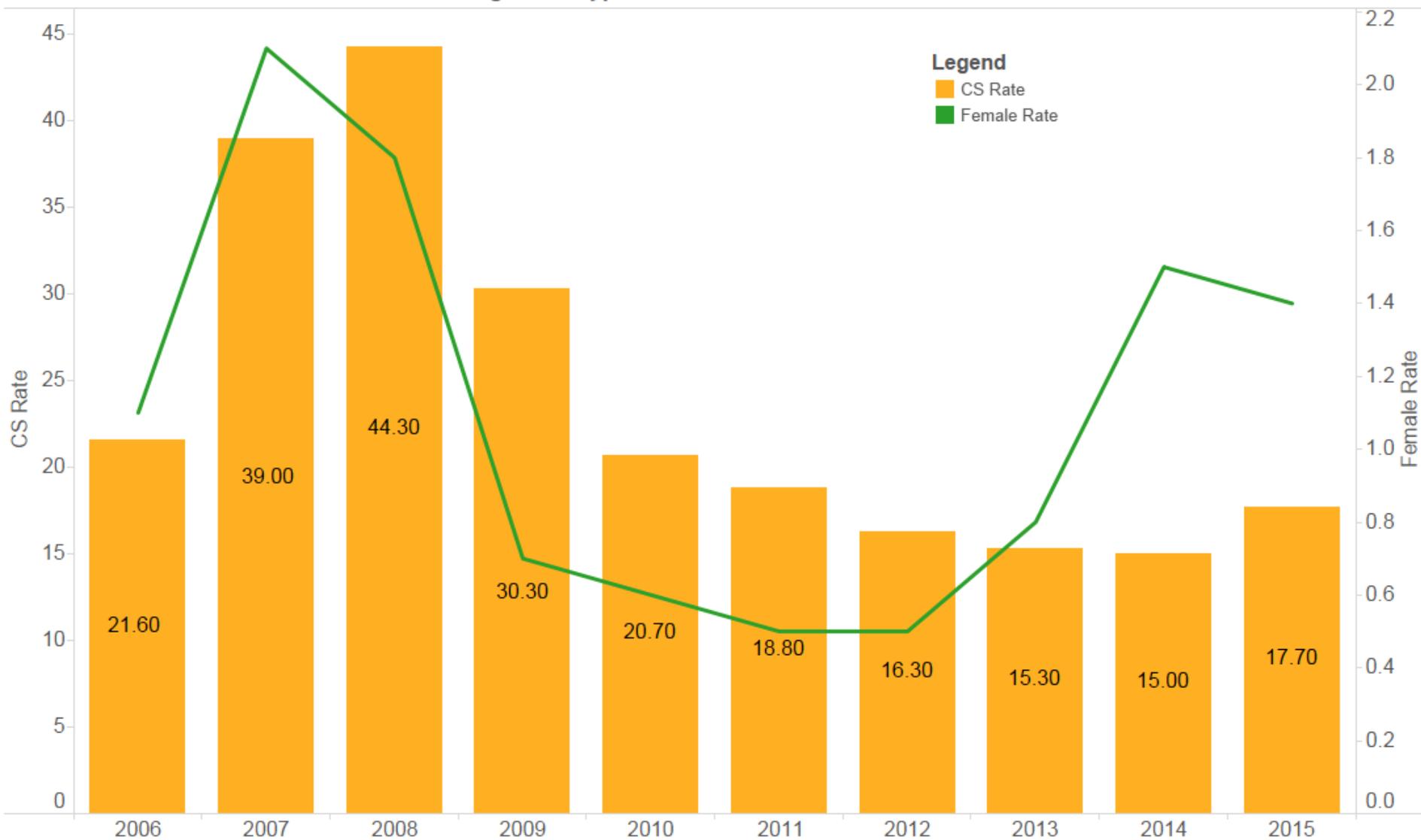


Arizona Trends

- 2013 - 2014:
 - Congenital Syphilis decreased from 15.3 to 15.0 cases / 100,000 live births
 - Case count remained the same at 13
 - Primary and Secondary Syphilis increased 0.8 to 1.5 (46.6%) among women
 - 27 to 49 cases (44.9%)



Female Case Rate in Arizona and the Congenital Syphilis Rate 2006-2015



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Mothers in Arizona

- 2014
 - 13 mothers of infants with Congenital Syphilis
 - 5 (38.5%) received no prenatal care
 - 8 (61.5%) had one or more prenatal visits
 - 1 tested negative in first trimester but acquired syphilis before delivery
 - 11 (84.6%) did not receive treatment or were treated too late



Congenital Syphilis is a Sentinel Event

- Reflects numerous missed opportunities for prevention
 - Primary prevention of syphilis among women of reproductive age and men who have sex with women
 - Prevention of mother to infant transmission among pregnant women already infected with syphilis



CDC Recommendations

- All pregnant women be screened for syphilis at their first prenatal visit
- Women at increased risk for syphilis and women living in high-morbidity geographic areas should also be screened at the beginning of their third trimester and again at delivery



Prevention

- CS cases and cases of syphilis among women should be reported to the local health department within 24 hours of diagnosis
 - Report pregnancy status



Prevention

- Encourage routine screening according to CDC Guidelines
- Educate physicians and healthcare providers about all screening guidelines
- Encourage “normalization” of sexual discussions and history-taking of patients



TARGETING POPULATIONS FOR PREP IN AZ



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Targeting Populations for PrEP in AZ

- STD diagnoses continue to increase across the US
 - Trends for Gonorrhea and Syphilis are shifting disproportionately toward men who have sex with men (MSM)
- Emergent HIV remains relatively stable, while prevalence continues to increase
 - MSM are the most affected by HIV
- PrEP has been shown to reduce the risk of HIV infection in high-risk groups by 92%
- This study seeks to identify those populations within Arizona, specifically Maricopa County, for targeting and expanding access to PrEP to those at greatest risk for acquiring HIV



BACKGROUND



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STD Trends Across the U.S.

- Reported in 2014:
 - Chlamydia
 - ~1.4 million cases (the highest number ever reported to CDC)
 - 2.8% increase from 2013
 - Young people (15-24 years old) disproportionately affected
 - Gonorrhea
 - ~350k cases
 - 5.1% increase from 2013
 - Young people (15-24 years old) disproportionately affected
 - Syphilis (primary & secondary)
 - ~20k cases
 - 15.1% increase from 2013
 - Men account for 90% of all P&S cases (83% among MSM)



HIV Trends Across the U.S.

- CDC estimates 1.2 million people >13 years are living with HIV
 - # of people living with HIV continues to increase
 - Incident cases remain relatively stable (~50k new cases every year)
- MSM of all races/ethnicities are the most affected by HIV
 - Incident cases in MSM increased 12% from 2008 to 2010



HIV Trends in AZ

- Reported in 2014:
 - Incidence: 9.81 per 100,000
 - Prevalence: 251.85 per 100,000
 - AZ has seen an increase of 16% in persons living with HIV/AIDS over the last 5 years
 - MSM account for 58.6% of emergent HIV/AIDS cases, the highest among all risk categories



STDs: One gateway to HIV

- Meta-analysis of 31 longitudinal studies demonstrated a 4 fold increased risk in HIV infection with any laboratory documented STD
- 2 to 3-fold increase in HIV shedding among those with genital STDs
- 50% of an HIV-positive military population were diagnosed with any STD prior to HIV diagnosis



Special Populations: STDs and HIV in MSM

- MSM are at an increased risk for STDs and HIV
- Rate of GC in men increased 10.5% from 2013-2014
- The rate of P&S syphilis in men has increased every year since 2000
 - 2014 rate: 11.7 per 100,000
 - 82.9% of cases occurred among MSM
- Approximately 40,000 HIV cases nationwide in 2014
 - Estimated 30,000 new HIV diagnoses in MSM in US every year



STDs: One gateway to HIV in MSM

- Prior GC/CT infections in MSM
 - 2 or more rectal infections have been shown to be associated with 8-fold increased risk in HIV
 - Fraction of HIV infections attributable to GC or CT in young MSM is 14.6%
 - 3-fold risk of HIV infection among MSM diagnosed with rectal CT/GC (controlling for sexual behavior)



PrEP: Opportunities for high-risk patients

- Efficacy of PrEP (TDF/FTC)
 - iPrEx Trial: 92%
 - Partners PrEP: 90%
 - TDF2: 85%
- Recommended as a prevention option:
 - Sexually active adult MSM at substantial risk for HIV
 - Heterosexually active men and women at substantial risk for HIV
 - Adult injection drug users at substantial risk of HIV acquisition



Targeting our High-Risk Populations in Maricopa County

- Access to STD and HIV State Surveillance systems
- Risks will be evaluated through analysis of HIV cases previously diagnosed with at least one STD



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METHODS



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Patient Sample

- STD diagnosis reported to CDC between 2009-2013
 - Reportable STDs: Chlamydia, Gonorrhea, Syphilis
- Infected cases of STDs and HIV:
 - Diagnosis of an STD between 2009 and 2013
 - Diagnosis of HIV after January 1, 2009*
- HARS record linked to the patient record in the STD database
- County of diagnosis for both STDs and HIV: Maricopa



Data Analyses

- Descriptive statistics
 - Basic statistics (frequencies, means, case counts) to better understand the data
- Logistic regression analysis
 - Looking for characteristics that can help “predict” our outcome (HIV diagnosis following an STD diagnosis)



RESULTS



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STDs and HIV in Maricopa County, AZ: 2009-2013

- 109,918 cases of CT, GC, and Syphilis
- 2,262 cases of emergent HIV
- 607 cases diagnosed with an STD and HIV
 - 26.8% of emergent HIV cases
 - 44.0% diagnosed with an STD prior to HIV diagnosis



Demographics in Cases with STDs Prior to HIV Infection

Descriptive statistics for individuals diagnosed with an STD prior to being diagnosed with HIV, Maricopa County, 2009-2013				
	Chlamydia (%)	Gonorrhea (%)	Syphilis (%)	Total (%)
Gender				
Male	30.71	40.82	21.72	93.26
Race				
White	12.73	18.35	7.49	38.58
Black	8.24	8.61	1.87	18.73
AI/AN	1.50	1.12	0.37	3.00
Other	12.36	14.98	12.36	39.70
Ethnicity				
Hispanic	12.36	14.61	11.99	38.95
Age				
≤29	23.60	28.46	12.73	64.79
MSM	30.52	41.37	22.09	93.98
Risks				
Male sexual contact with other male	26.59	37.08	17.60	81.27



Zoom! Enhance!

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Gender				
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Risks				
Male sexual contact with other male	26.59	37.08	17.60	81.27

STDs Prior to HIV Infection

- Mean number of STDs prior to HIV infection:
 - 1.04 (± 0.25 , range: 1-4)
- STDs prior to HIV diagnosis:
 - 43.6% Gonorrhea
 - 34.3% Chlamydia
 - 22.1% Syphilis
- Mean time to HIV diagnosis:
 - 2.15 years (± 1.46)



Predictors of HIV Diagnosis

- Controlling for age, race, and gender
- Odds of HIV diagnosis following STD diagnosis:
 - In non-Hispanics diagnosed with Chlamydia is 4.32 (95% CI: 2.1-8.9) times the odds in non-Hispanics diagnosed with P&S Syphilis
 - In non-Hispanics diagnosed with Gonorrhea is 6.34 (95% CI: 3.1-12.9) times the odds in non-Hispanics diagnosed with P&S Syphilis



DISCUSSION



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Findings and Recommendations

- Who could benefit from targeted intervention and a risk assessment for PrEP in Maricopa County?

MSM

Non-Hispanic Blacks and Whites

CT/GC positive diagnosis



Limitations

- Underestimate of cases diagnosed with STDs and HIV in PRISM
- Evaluating a static time period and assuming a static population



What's Next?

- In depth analysis of STDs commonly diagnosed prior to and after HIV diagnosis
- PRISM and Partner Services



What's Next?

- Pare the data down into smaller geographical divisions for high morbidity areas



SPATIAL ANALYSIS



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Spatial Analysis

Where

Size

Shape

Distribution

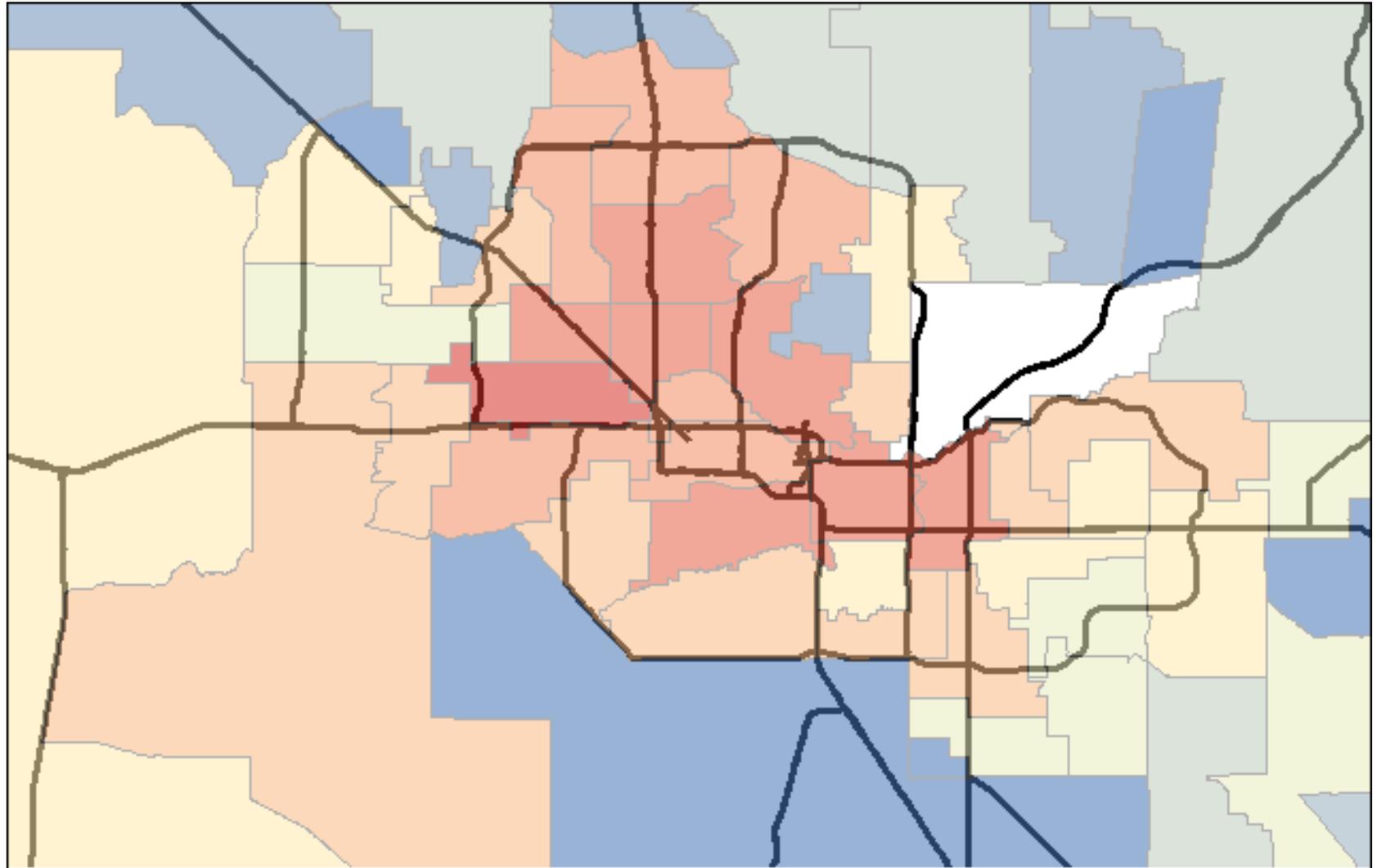
Patterns



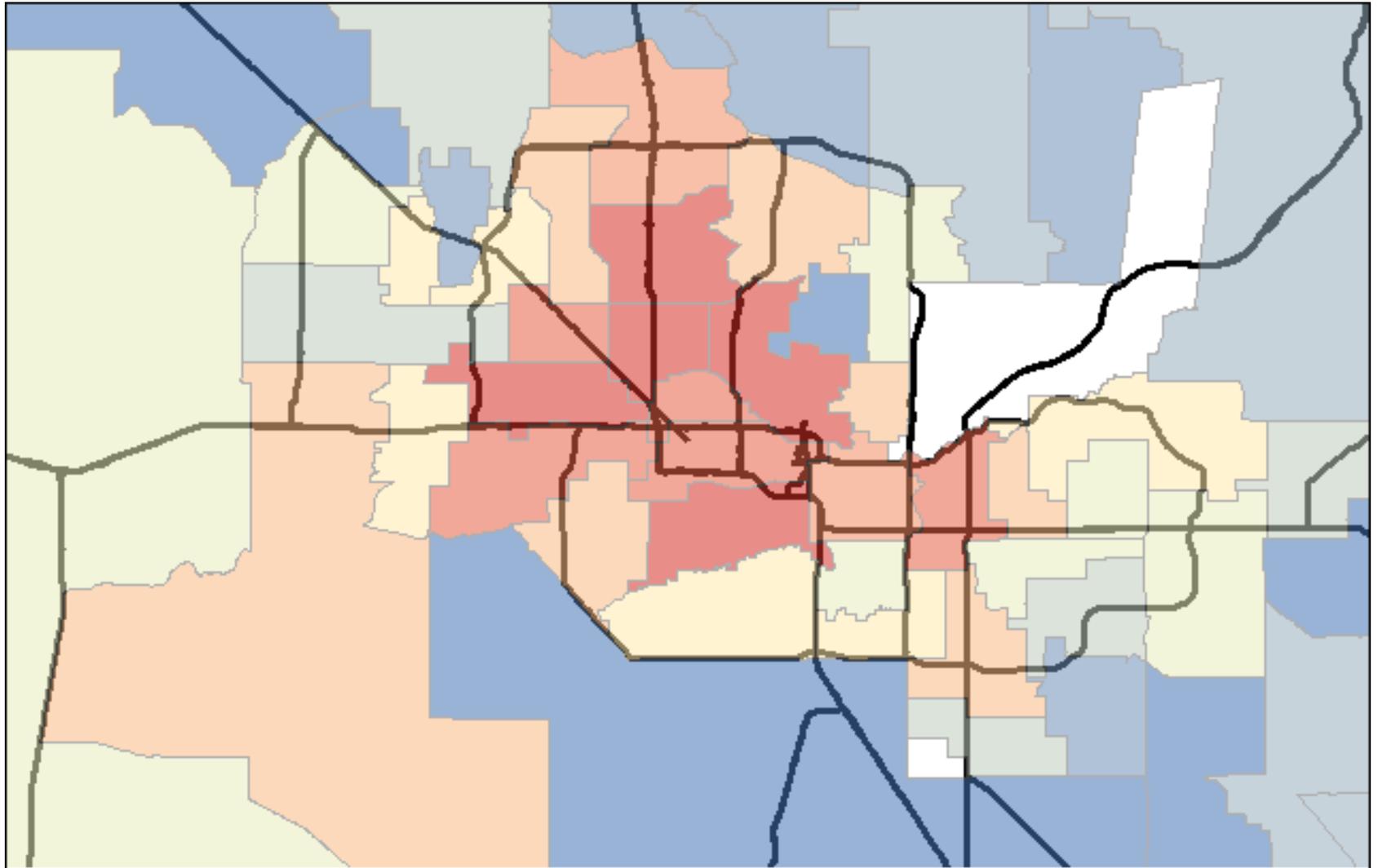
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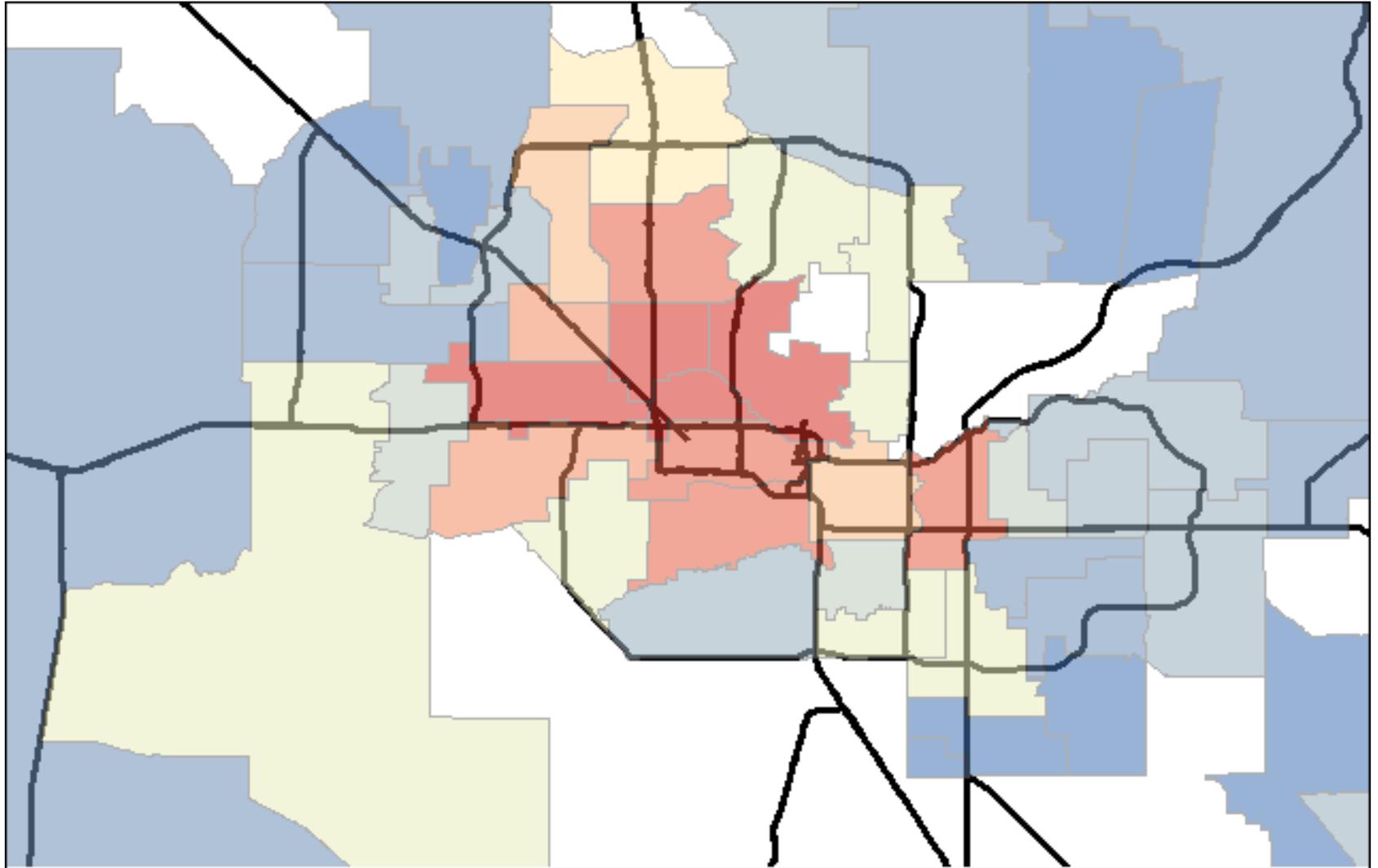
Chlamydia by PCA - 2015



Gonorrhoea by PCA - 2015



PS Syphilis by PCA - 2015



WHAT ABOUT TIME?



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Analyzing Time

- Time Snapshots
- Grouping
- Data Analysis



Time Snapshots

<https://vimeo.com/8510106>



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References

- Sources available upon request



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THANK YOU

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