

Race, Ethnicity, and Socioeconomic Status: Risk Factors for Chlamydia and Gonorrhea in Region VI IPP

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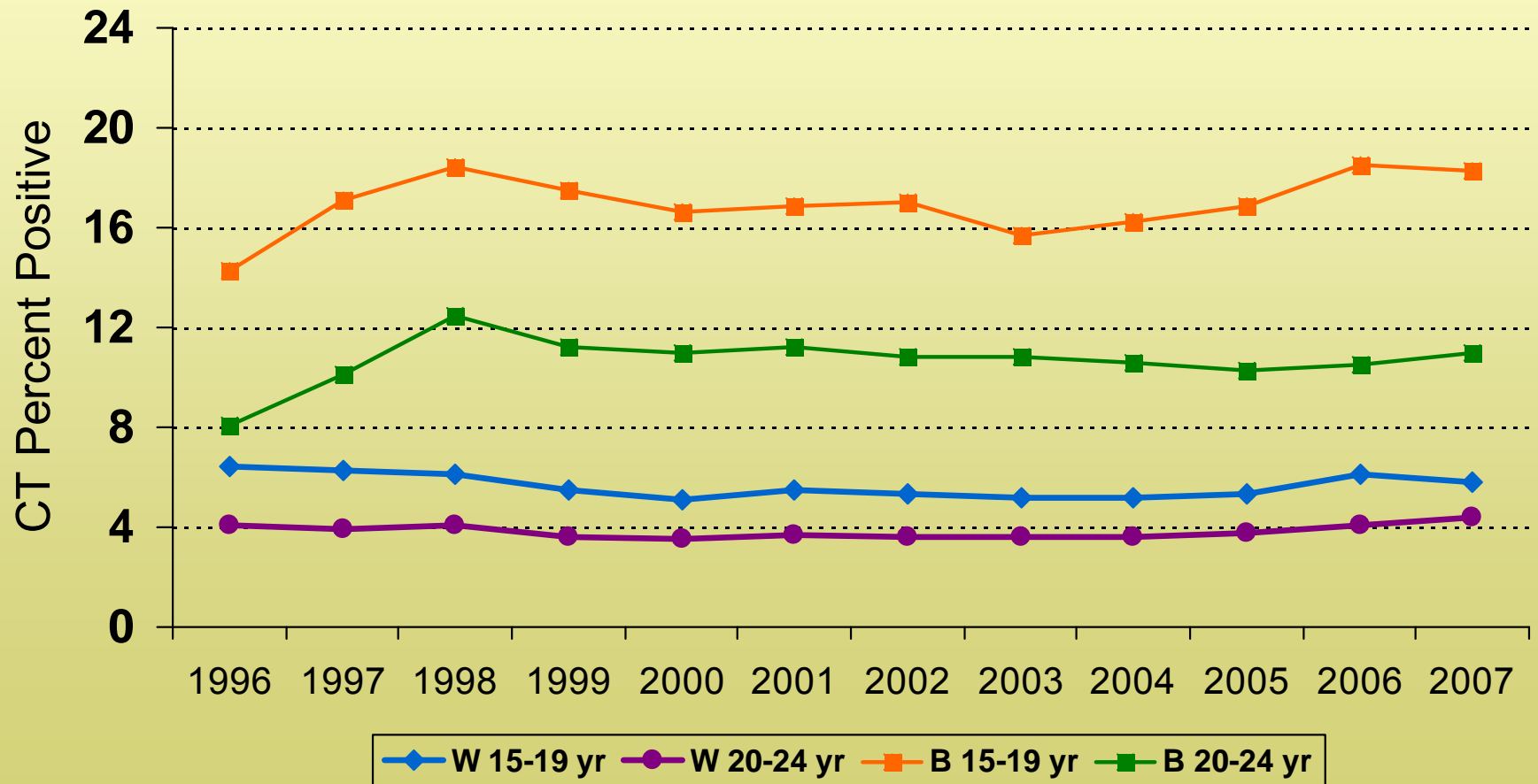
Background

- Regional data product
 - CDC directive from most recent Infrastructure application
 - Identify analysis project and dissemination process
- Racial/ethnic and socio-economic status (SES) differences in chlamydia and gonorrhea positivity
 - Methods—sample, measures and analysis plan
 - IPP data sets do not capture SES, but there may be useful proxies—Area-based socioeconomic measures (ABSM) available from U.S. Census
 - ABSM can be identified for Census tracts...but also approximated for ZIP codes

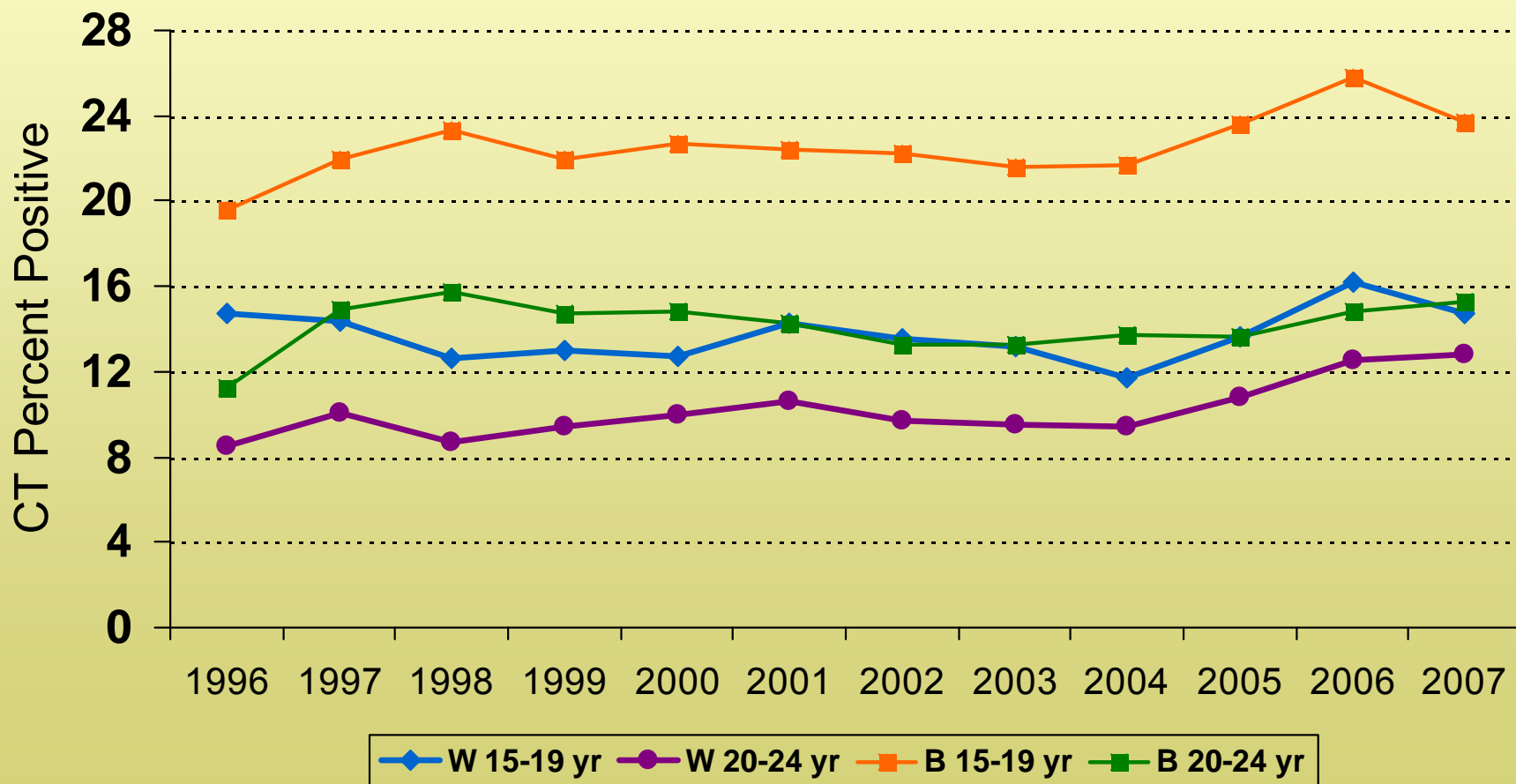
- Race/ethnicity, SES and STI
 - Whether assessed by case rate or prevalence, numerous studies and surveillance systems have shown consistent and enduring racial/ethnic differences in STI
 - Most research has focused on non-Hispanic Whites, NH Blacks, and Hispanics
- IOM report on racial/ethnic health disparities
 - Recommended a “comprehensive, multi-level strategy...to eliminate these disparities.”
 - “The sources of these disparities are complex, are rooted in historic and contemporary inequities, and involve many participants at several levels.”

- **STI trends in Region VI IPP**
 - FP and STD, female clients aged 15-24 years
 - 1996-2007, 1.3 million CT/GC tests
- Presented Fall 2007 RIPAC meeting
- Client race/ethnicity and age differences were key factors in STI positivity

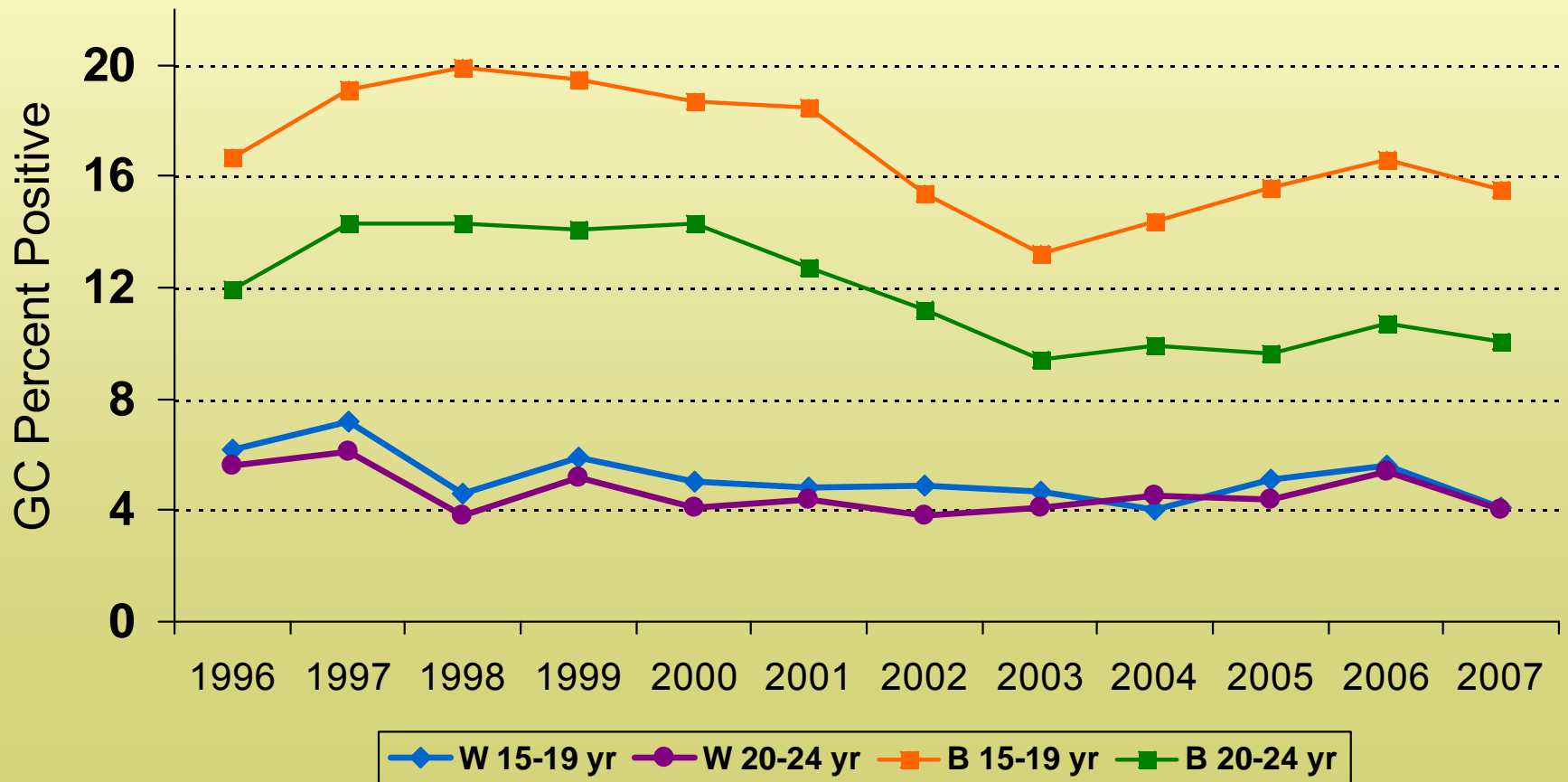
Chlamydia positivity in 15-19 & 20-24 year old women screened by race in FP clinics: Region VI, 1996-2007



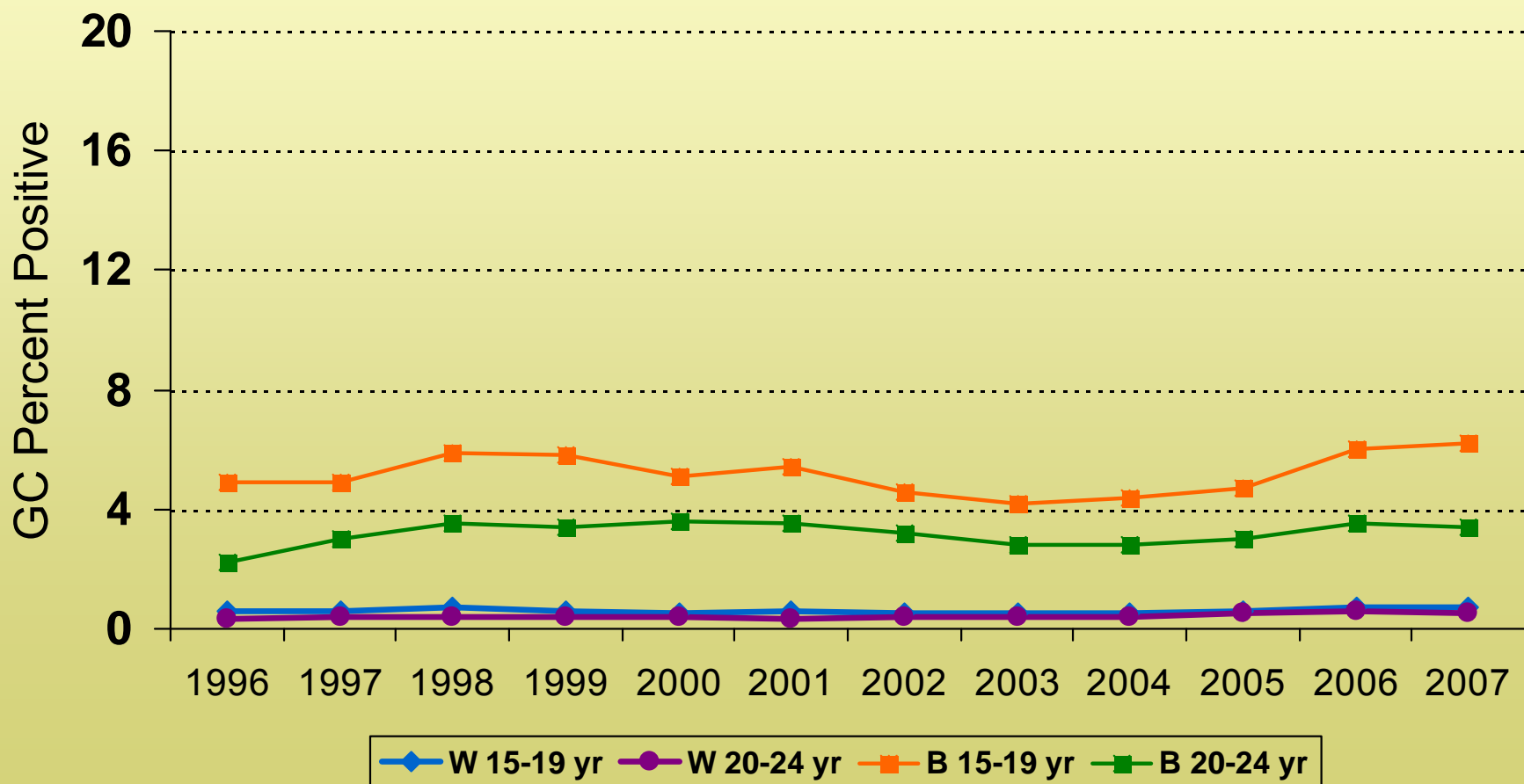
Chlamydia positivity in 15-19 & 20-24 year old women screened by race in STD clinics: Region VI, 1996-2007



Gonorrhea positivity in 15-19 & 20-24 year old women screened by race in STD clinics: Region VI, 1996-2007



Gonorrhea positivity in 15-19 & 20-24 year old women screened by race in FP clinics: Region VI, 1996-2007



- One major focus in exploring underlying causes of racial and ethnic disparities rests on the association between race/ethnicity and socioeconomic status (SES).
- Measuring SES has been an evolving process, particularly when ascribing class status to adolescents or young adults who have not yet transitioned fully to adult roles.
- SES indicators in this situation have included household income, parents' job classification, parental educational attainment and youth educational aspirations
- However, collecting SES indicators on clients during routine clinic services is a challenging and, in fact, unrealistic goal.

- Researchers, policy makers and program managers have sought alternative strategies for measuring individuals' SES.
- One general approach relies on aggregate descriptive information concerning the **area** within which clients reside.
- Areal units may involve U.S. Census tracts or blocks, as well as ZIP code tabulation areas (ZCTA).
- ZCTAs are a relatively new areal estimate generated by the U.S. Census Bureau beginning in the mid-1990s.

- **ZIP code**

A Zone Improvement Plan (ZIP) Code is the numerical code assigned by the U.S. Postal Service to designate a local area or entity for the delivery of mail. ZIP Codes may consist of 5, 7, 9, or 11 digits, and may refer to a street section, a collection of streets, an establishment, a structure, or a group of post office boxes.

- ZCTA are essentially polygons that capture U.S. Postal Service (USPS) ZIP codes.
- Areal SES variables are generally referred to as area-based socioeconomic measures (ABSM)—whether based on Census tracts, blocks, ZCTA, counties...

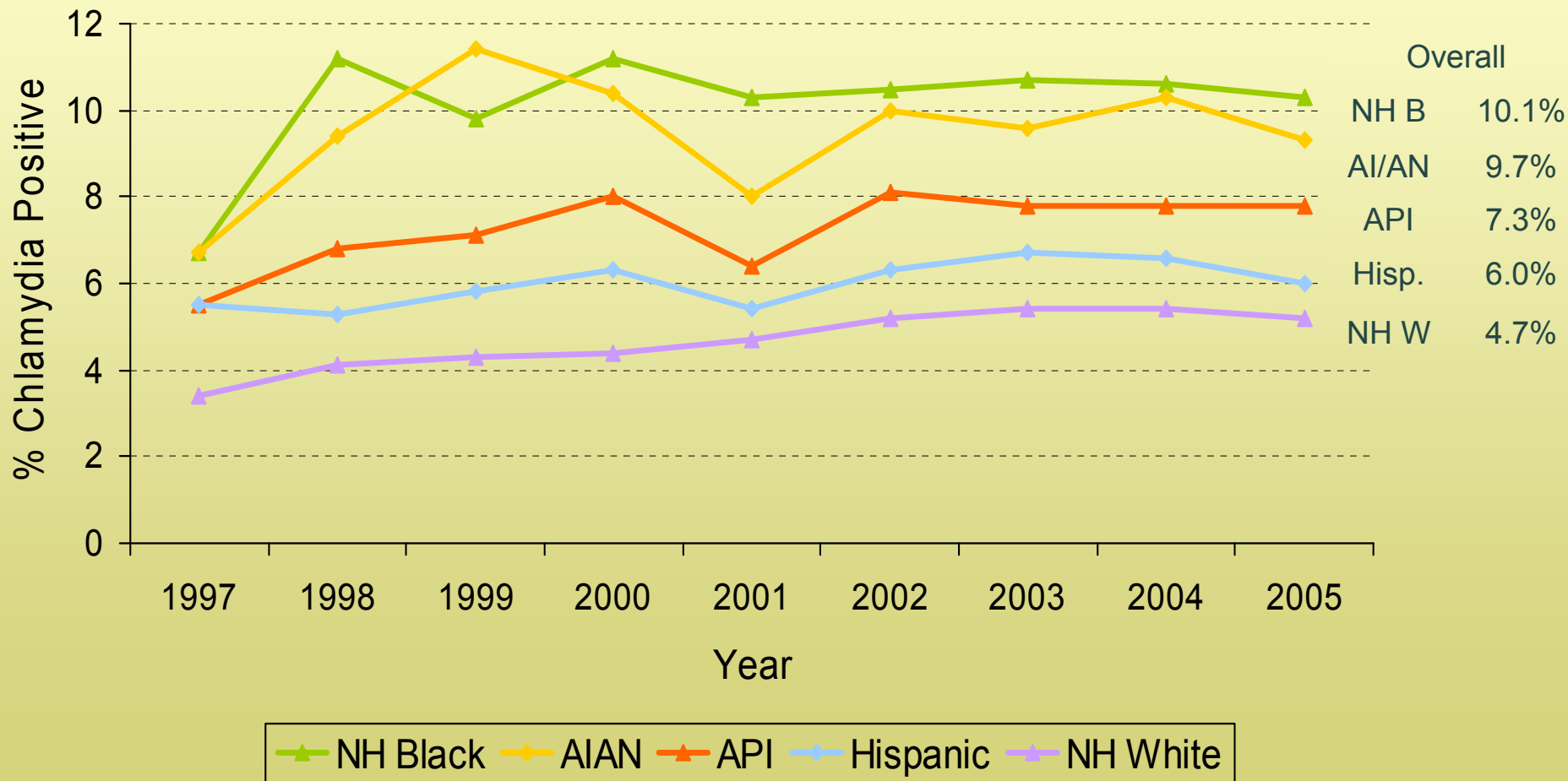
- The benefit of using ABSM is that summary information about SES can be based on an individual's residential ZIP code, i.e., we do not rely on individual responses to multiple SES questions.
- Although the use of ABSM has burgeoned in recent years, theoretical and technical issues have been hotly debated concerning the relevance and utility of these measures.

- Past studies of chlamydia trends in IPP and impact of individual measures and ABSM
 - STI are associated with race/ethnicity and class or socioeconomic status (SES)
 - IPP prevalence data show significant and enduring racial/ethnic disparities in CT and GC
 - To what extent are racial/ethnic differences due to differences in SES?



Results

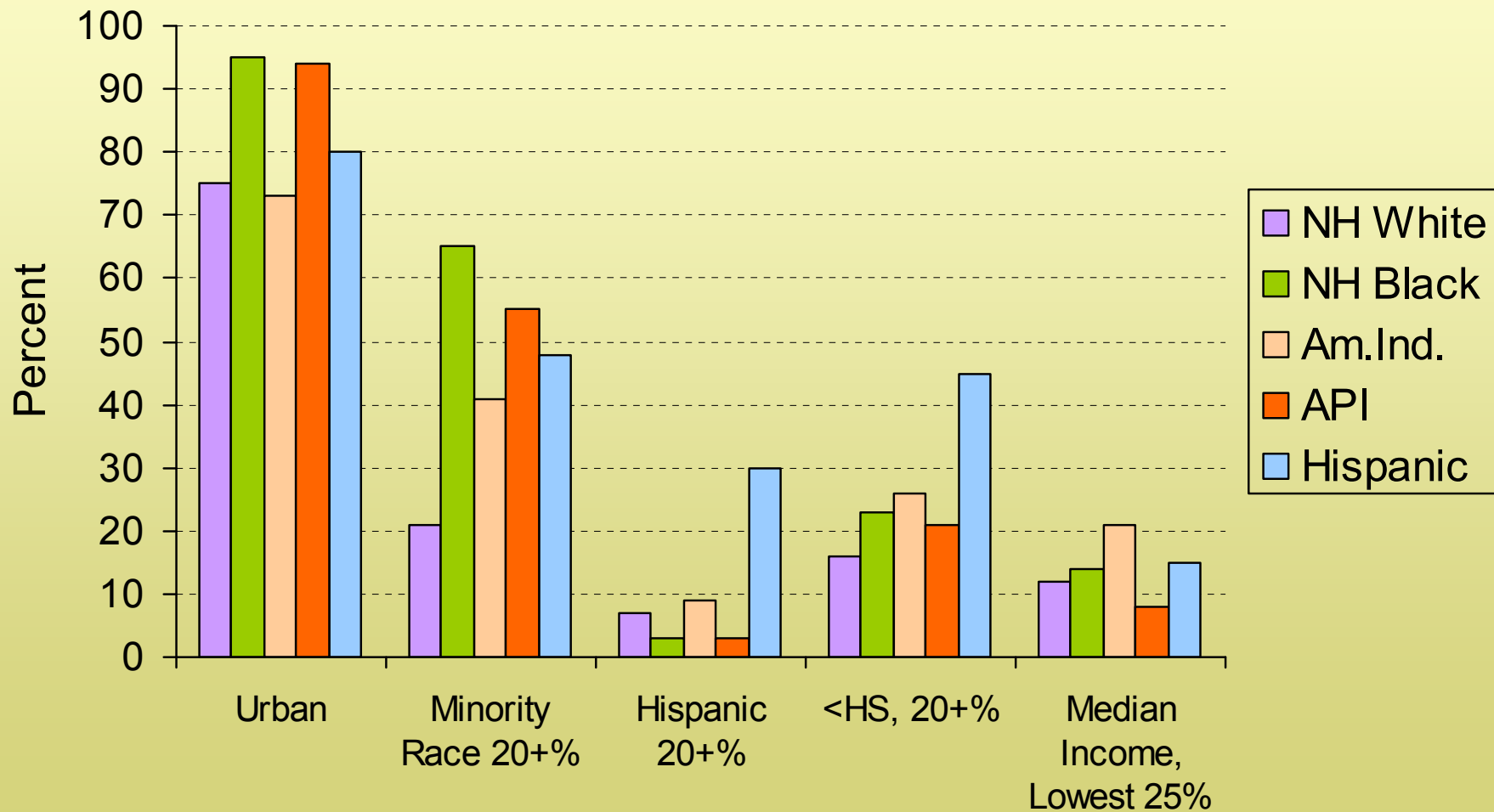
Chlamydia trends* in 15-24 year old women in family planning clinics: Region X, 1997-2005, by race and ethnicity



*Positivity unadjusted for test type



Region X: Race/ethnicity and ABSM/SES



Region X: Aggregate-level risk factors and chlamydia

Characteristic	Percent	% CT+
Household median income		
<\$30000	5%	5.6%
\$30000 thru \$34999	19%	5.5%
\$35000 thru \$39999	23%	5.2%
\$40000 thru \$44999	20%	5.5%
\$45000 thru \$49999	9%	5.5%
\$50000 thru \$59999	17%	5.5%
\$60000+	7%	5.1%
Household median income, quartiles*		
Highest 3 quartiles	88%	5.3%
Lowest quartile	12%	5.9%

*State-specific quartiles based on median incomes for **all** ZCTAs

Aggregate-level risk factors and chlamydia, cont.

Characteristic	Percent	% CT+
% Minority race		
< 20%	69%	4.7%
≥ 20%	31%	6.9%
% Hispanic ethnicity		
< 20%	92%	5.3%
≥ 20%	8%	6.6%
% Population age 25+ without HS diploma		
< 20%	80%	5.2%
≥ 20%	21%	6.2%
Population density		
Urban	78%	5.6%
Rural	22%	4.6%

Conclusions—Region X

- Race/ethnicity
 - Chlamydia positivity was stable over time for race/ethnic minority groups, after adjusting for other risk factors;
 - NH Whites showed a 5% annual increase
 - Race/ethnic-specific associations and models varied
- ABSM
 - Had modest, but significant effect on relationship between race/ethnicity and chlamydia positivity
 - Impact varied by race/ethnicity
 - Within race/ethnic group, racial composition of neighborhood affected risk of disease more than SES
 - Did not account for race/ethnic differences in predicted chlamydia positivity

Region VI Replication

- Why Region VI?
 - Racial/ethnic diversity
 - SES and urban/rural variation
 - Dual outcomes: CT and GC test results
 - Significant STI prevalence
 - Most Region VI states collect client ZIP code
- Expanded analyses (versus Region X) beyond FP and young women
- Limitations
 - Available IPP measures

Region VI: CT/GC, race, ethnicity and SES

- Past work suggests SES will be a factor in Region VI chlamydia trends
- Gonorrhea trends have not been explored in other regional IPPs
 - Unknown whether ABSM will affect CT and GC positivity independent of race/ethnicity
- Timeline
 - Data management and analysis—by March 2008
 - Initial results disseminated to RIPAC---May 2008
 - Regional feedback incorporated and final products disseminated—August 2008

Decision Process

- Focus on 2006 IPP data
 - Stable trends over time
 - LA, NM, OK, and TX capture client ZIP codes
- Phase I: FP, female clients age 15-24 years
 - Replication of Region X and CDC priority population
- Phase II: STD, male & female clients

Objectives

- Assess race/ethnic differences in chlamydia and gonorrhea positivity
- Generate area-based socioeconomic measures (ABSM) for Region VI states and merge with IPP records
- Explore ABSM in conjunction with individual-level race/ethnicity as factors predicting STI

ABSM—U.S. Census 2000

- ABSM reflect the neighborhood where clients reside—not individual client characteristics, but aggregate geographic area characteristics
- U.S. Census 2000 ZIP code tabulation area data—Louisiana, New Mexico, Oklahoma and Texas
- On the U.S. Census Bureau website, American FactFinder page, extracted decennial census data sets for summary file 1 (SF1) and summary file 3 (SF3)
- Generated data based on “geo within geo” variables: 5-digit ZIP code within state

Links

- U.S. Census Bureau FactFinder:

http://factfinder.census.gov/home/saff/main.html?_lang=en

- Data Sets:

http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=datasets_1&_lang=en

- Census 2000 Summary File 1 (SF1) presents counts for age, sex, race, Hispanic/ Latino origin, household relationship, whether residence is owned or rented
- Collected from all people and housing units
- Used data in SF1 to identify percentages of minority race, Black/African-American, and Hispanic ethnicity based on:
 - P1- Total population
 - P7- Race categories (multiple measures)
 - P11- Hispanic or Latino
- All variables are 'counts'—raw numbers

- Census 2000 Summary File 3 (SF3) presents detailed population and housing data (education, employment status, income, value of housing unit, year structure built) collected from a 1-in-6 sample and weighted to represent the total population
- Data in SF3 was used to identify the following variables:
 - P37- Sex by education attainment for population 25 years and over
 - P53- Median Household Income in 1999 (Dollars)
 - P87- Poverty Status in 1999 by age
- Again, all variables are counts within ZCTAs

- What's your ZIP code? What's the median (average) household income across every household in your ZIP code? How good an estimate is the ZIP median of your neighborhood's SES, compared to other areas?
- Three Seattle ZIPs...
- 98112 median household income (1999) was \$59,693
- North of 98112 around Univ of WA: \$40,246
- South of 98112: \$32,085
- East toward the suburbs: \$63,358
- List all ZIP code median incomes (or other ABSM) in each state and then categorize them...like 'top 25%' 'bottom 10%' 'below \$30,000' etc.

- Categorized Census data SES measures for each ZCTA (ZIP code tabulation area)
 - Household income: categorized Census data for **each** state separately
 - Relative and ‘absolute’ measures generated
 - Categorized household income data again after merging Census information with IPP data
 - FPL categorized at the Census level overall (already adjusted for variation in state income)
 - Education—focused on % of adult population without a high school diploma

ABSM—Urban/Rural Status

- Historically, used population of town/city where clinic located
 - Positive: relatively easy to calculate and categorize
 - Negative: clients travel to clinic sites
- We accessed the University of Washington Rural Health Resource Center (UW RHRC) webpage
- Researchers have developed new approaches to measuring population density- rural/urban commuting areas (RUCA)
- Used the 2004 RUCA ZIP code approximation files
- 2- and 4- and 10-category versions of population density
- <http://depts.washington.edu/uwruca/download.html>

Methods

- ABSM generated from U.S. Census 2000 Summary Files 1 and 3
- Geo-coded to ZCTAs, ZIP code tabulation areas
- ABSM
 - Median household income, various ways
 - Percent below FPL
 - Percent racial minority
 - Percent Black
 - Percent ethnic Hispanic
 - Population density (from RUCA codes)
 - Educational attainment
- Aggregate (area) measures merged with CT test records via patient ZIP code

- Data sets from the U.S. Census Bureau and UW RHRC were exported into Excel workbooks, one workbook per state
- Files were sorted and duplicate ZIP codes deleted—USPS does **not** care (well, maybe doesn't care sometimes) about state boundaries (Truth: most ZIP codes honor state lines)
- Aggregate ZIP code Census and RUCA records merged into IPP data by client ZIP code

- Sample—all chlamydia and gonorrhea test records, CY 2006
- Measures
 - Individual: patient demographics (sex, age, race, and ethnicity); test result, visit date, provider type, and client ZIP code from IPP records
 - ABSM: summary measures based on client's ZIP code that characterize their 'neighborhood'
 - **Virtually all ABSM calculated using total state ZIP codes—rather than categorizing these aggregate measures after being merged into IPP data**
 - **ABSM reflect total state population**



Analysis

- Assessed inter-relationships among client race/ethnicity, socio-economic community measures and chlamydia and gonorrhea
- Generated models for various sub-samples: sex, provider type and each race/ethnic group
 - Race/ethnicity samples limited to NH White, NH Black and Hispanic clients
 - Asian, Hawaiian/Pacific Island, and American Indian sample sizes too small for within-group analyses

CY 2006 IPP data

- Total records, 5 states 326,074
- Records with ABSM, 4 states 177,326
- Proposed 2 samples for analysis
 - ABSM, FP female, age 15-24 59,177
 - ABSM, STD all clients 70,399

ABSM—U.S. Census, SF1 Measures

Characteristic	Census %	FP sample %	STD sample %
% racial minority			
0-9%	23	6	3
10-19	27	18	12
20-29	20	29	22
30-39	13	18	20
40-49	6	9	14
50+ %	10	21	30
Hispanic			
0-9%	53	62	23
10-19	17	7	13
20-29	8	5	8
30-39	5	8	11
40+ %	17	18	44

N=59,177

ABSM—U.S. Census, SF1 Measures

	Census	FP Sample	STD Sample
Black	%	%	%
0-9%	72	52	55
10-19	12	10	10
20-29	6	9	16
30-39	4	7	6
40+ %	7	22	12

ABSM—U.S. Census, SF3 Measures

Characteristic	Census%	FP sample %	STD sample %
% below FPL			
0-9%	23	9	18
10-19	43	36	33
20-29	23	32	39
30+ %	11	23	10
% < HS diploma			
0-9%	9	5	10
10-19	21	16	25
20-29	34	32	22
30-39	23	31	14
40+ %	13	17	29

ABSM—U.S. Census, SF3 Measures

	Census	FP Sample	STD Sample
Household	%	%	%
Median income			
Lowest quartile	25	32	32
26-50%	25	23	22
51-75%	25	25	21
Top quartile	25	20	26

ABSM—Urban/rural status

	Census %	FP Sample %	STD Sample %
Urban	56	63	89
Rural	14	21	8
Small Rural	11	11	3
Isolated	19	5	1

Phase I Results

- Women aged 15-24 years seen at FP clinics, n=59,177 test records from CY 2006

FP women age 15-24 years, 2006

	LA	NM	OK	TX	Total
Total female FP tests, 15-24 y	23,646	9,133	26,910	18,566	78,255
% with ZIP Codes	98%	84%	47%	85%	76%
% with ZIP & match to Census	94%	90%	98%	90%	94%
RUCA	99+%	99%	99%	99+%	99+%
Sample	23,240	7,609	12,485	15,843	<u>59,177</u>

- FP female sample, aged 15-24 years
 - Race/ethnicity of the sample and relationship to ABSM: neighborhood characteristics

Racial/Ethnic Differences and ABSM

Characteristic	% NH White	% NH Black	% Hispanic
Age 15-19 yr	42	43	40
% Minority, ABSM			
0-9%	12	2	2
50+ %	7	45	19
% Black, ABSM			
0-9%	60	11	76
30+ %	9	76	13
% Hispanic, ABSM			
0-9%	11	7	9
30+ %	10	34	34

FP women age 15-24 years, 2006

Racial/Ethnic Differences and ABSM

Characteristic	NH White %	NH Black %	Hispanic %
% < HS diploma			
0-9%	5	5	6
10-19%	19	14	11
20-29%	39	23	26
30-39%	28	42	25
40+ %	10	16	32
% Hsehd median inc			
Lowest quartile	22	41	42
% Urban	54	68	75

FP women age 15-24 years, 2006

Phase I: FP female clients age 15-24 yrs, 2006

Sample characteristics and STI

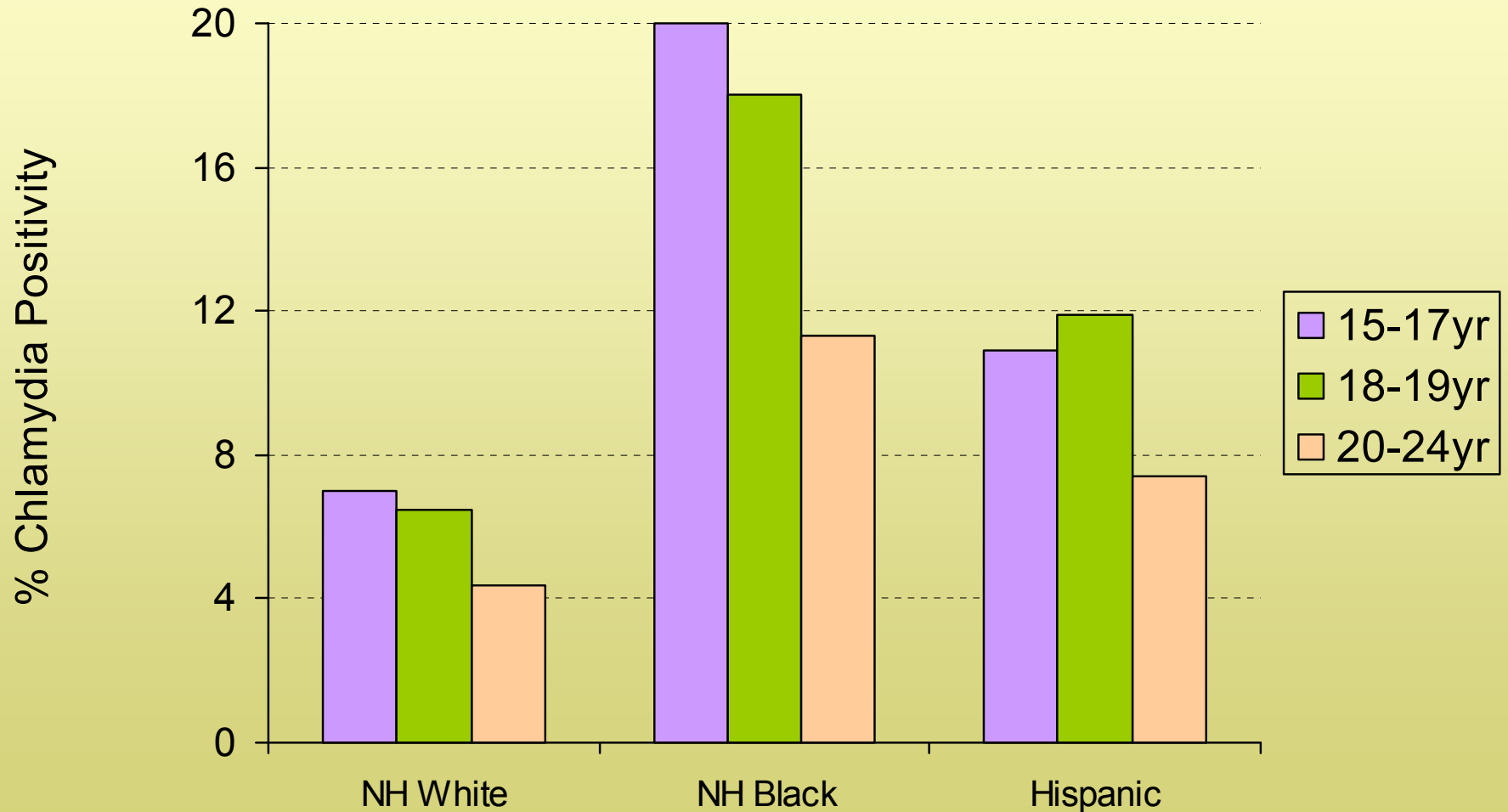
State	%	% CT	% GC
LA	39	8.1	2.2
NM	13	9.8	1.4
OK	21	7.4	1.1
TX	27	11.3	2.3
Overall		9.1	1.9

N=59,177

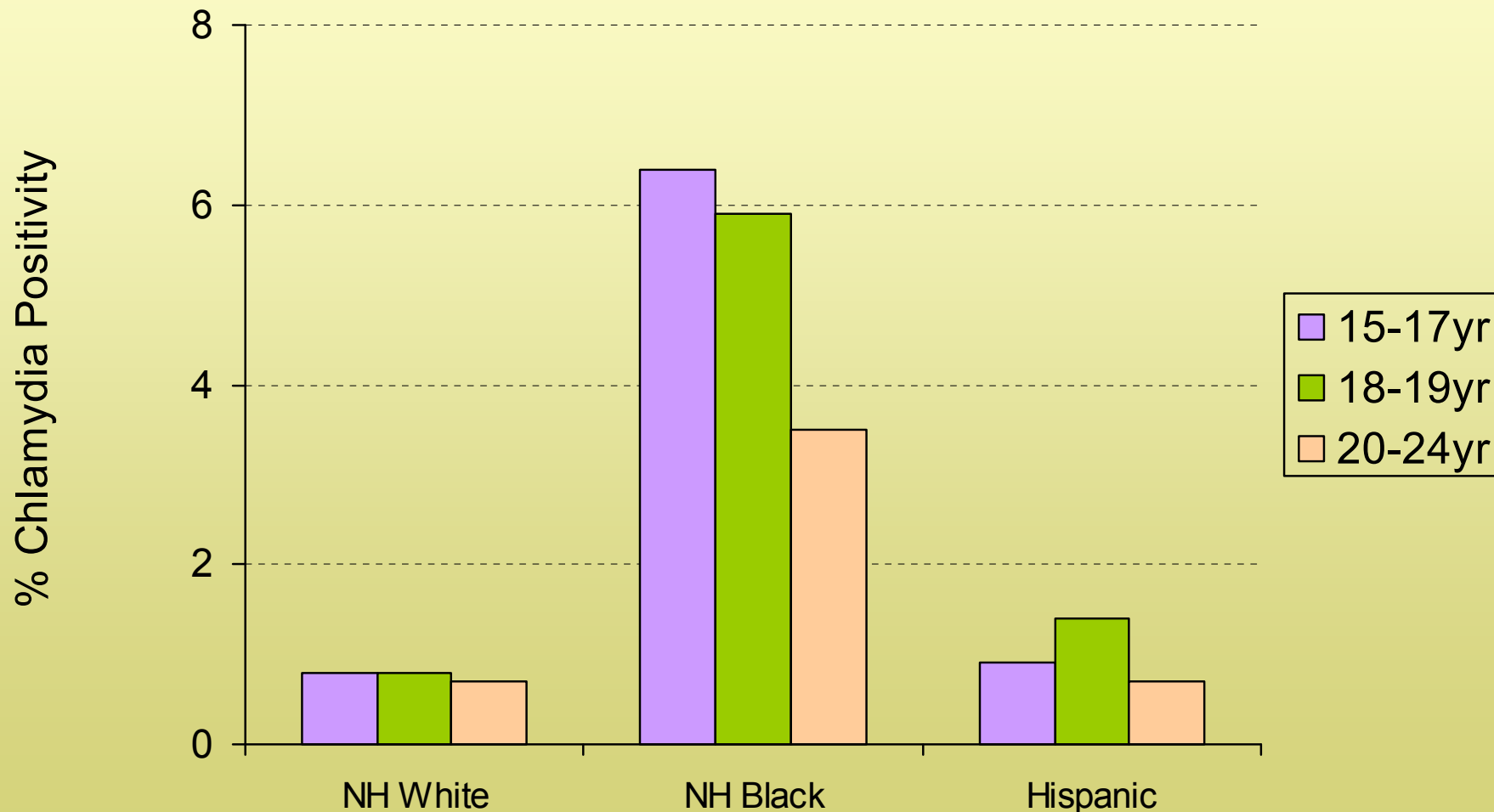
Individual Risk Factors and CT/GC

Characteristic	%	% CT+	% GC+
Age			
15-17	19	11.7	2.4
18-19	23	11.4	2.5
20-24	58	7.2	1.5
Race/ethnicity			
NH White	44	5.4	0.7
NH Black	29	14.5	4.6
Hispanic	25	9.0	0.9
Other	3	8.8	1.4

Client race/ethnicity, age and chlamydia



Client race/ethnicity, age and gonorrhea



ABSM Risk Factors and CT/GC

Characteristic	%	% CT+	% GC+
% Racial minority, ABSM			
0-9%	6	4.7	0.6
10-19	18	6.4	1.1
20-29	29	8.6	1.5
30-39	18	9.1	1.9
40-49	9	9.7	1.9
50+ %	21	13.6	3.7
% Hispanic, ABSM			
0-9%	62	8.2	2.0
10-19	7	13.1	2.9
20-29	5	11.2	1.8
30-39	8	12.2	3.4
40+ %	18	9.3	0.9

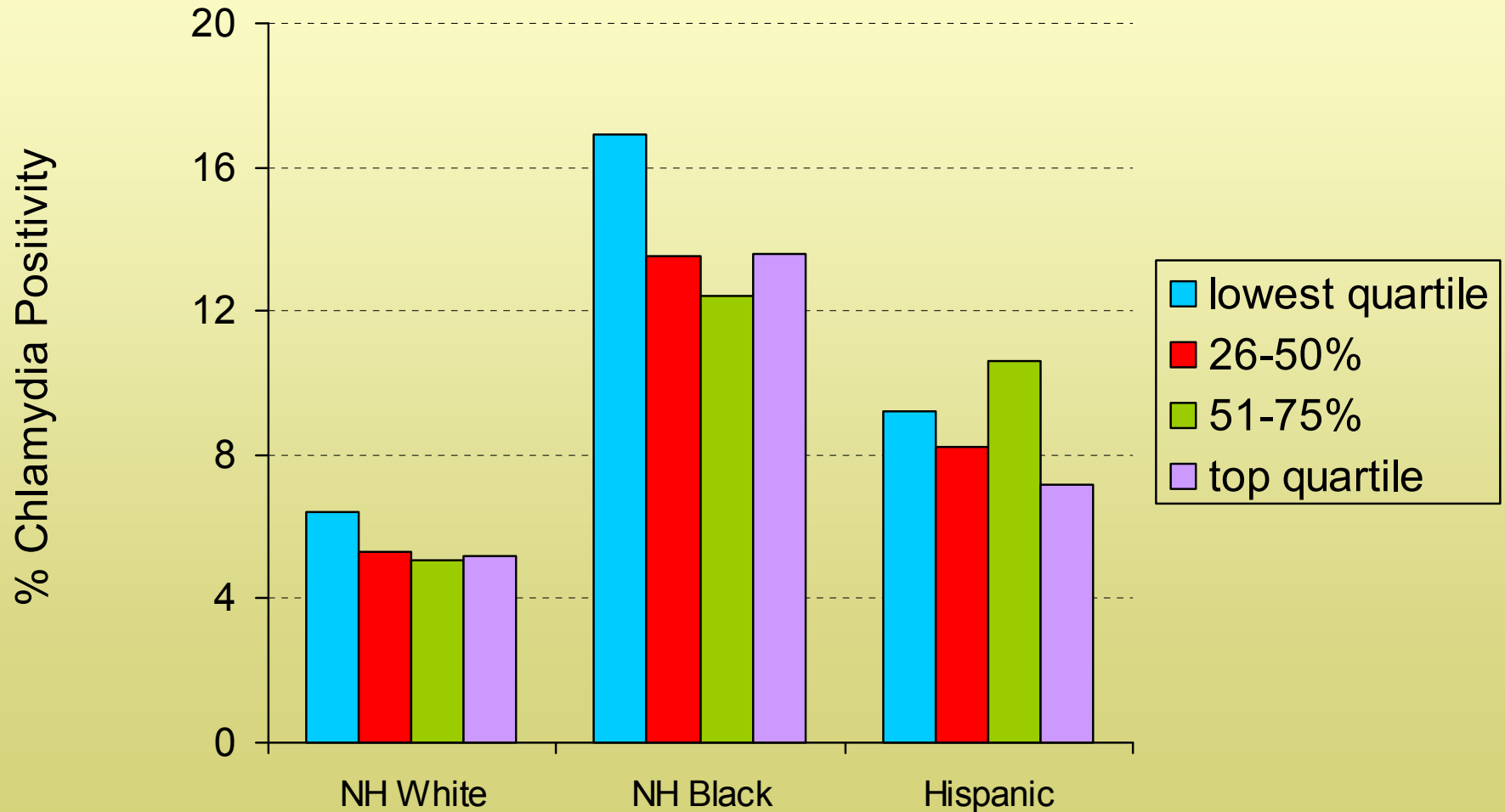
Characteristic	%	% CT+	% GC+
Median household income, ABSM			
<\$20K	7	12.3	3.8
20K- 24999	22	10.9	2.3
25K- 29999	27	8.7	1.7
30K - 34999	21	8.0	1.4
35K – 39999	9	7.9	1.6
40K – 44999	6	7.2	1.4
45K – 49999	3	7.4	1.2
50K+	5	11.0	3.0

Characteristic	%	% CT+	% GC+
% <100% FPL, ABSM			
0-9%	9	8.9	2.0
10-19	36	7.7	1.4
20-29	32	9.3	1.9
30-39	16	11.6	2.5
40+%	7	11.9	3.4
% < HS Diploma, ABSM			
0-9%	5	9.9	2.9
10-19	16	8.1	1.4
20-29	32	8.3	1.5
30-39	31	10.3	2.3
40+ %	17	9.7	2.1

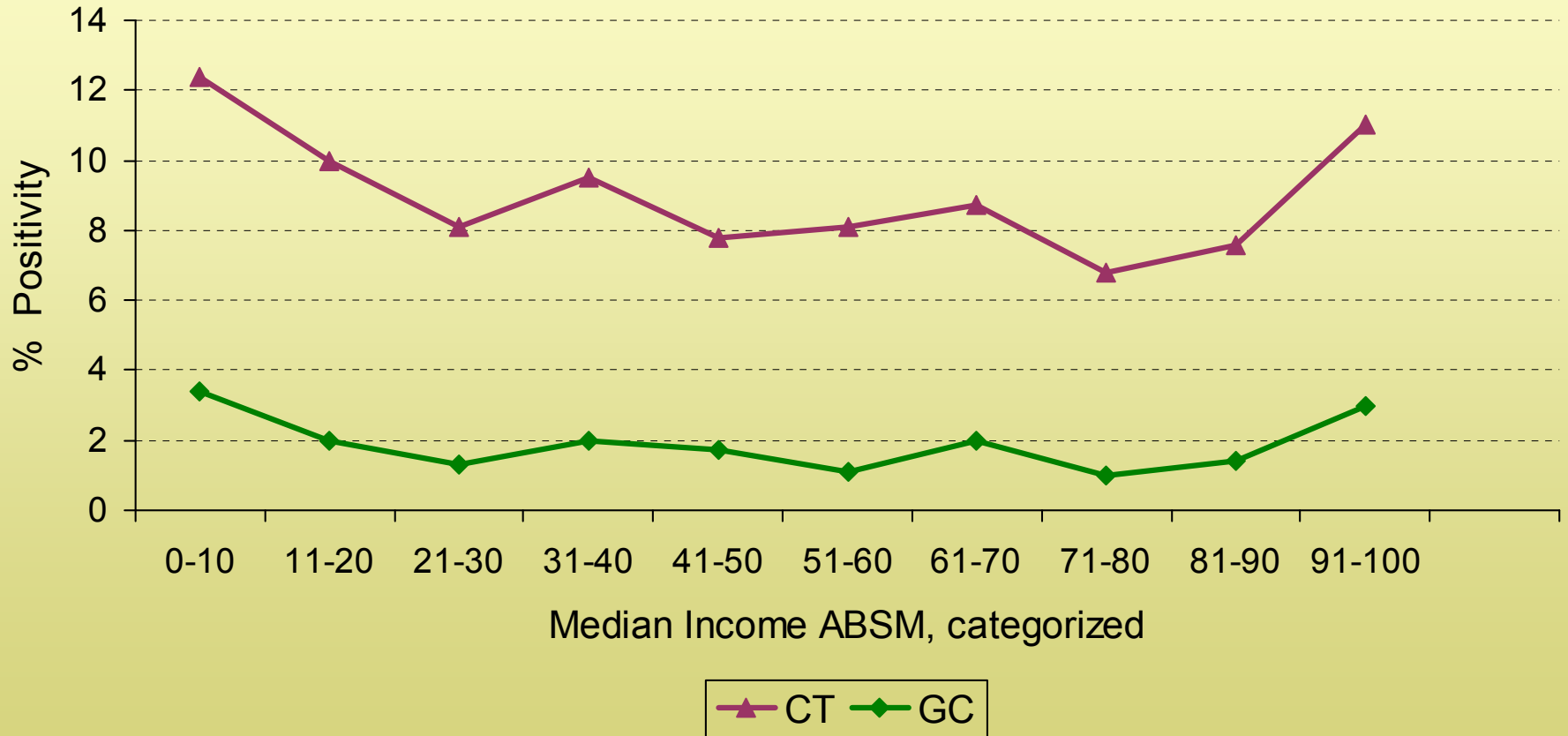
Characteristic	%	% CT+	% GC+
Urban-rural, ABSM			
Urban	63	9.6	2.1
Large rural	21	8.5	1.8
Small rural	11	8.4	1.5
Isolated	5	6.3	0.9
Household median income, ABSM			
Lowest quartile	32	11.2	2.5
26-50%	23	8.3	1.7
51-75%	25	8.4	1.7
Top quartile	20	8.0	1.7

- Prior slides: patient demographics (race/ethnicity and age) and ABSM in relation to chlamydia and gonorrhea
- Next step:
- Examine patient demographics and community measures (ABSM) jointly and their relationship to STI

Race/ethnicity, community household median income, and chlamydia

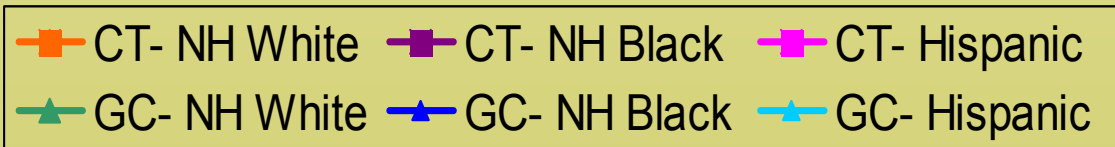
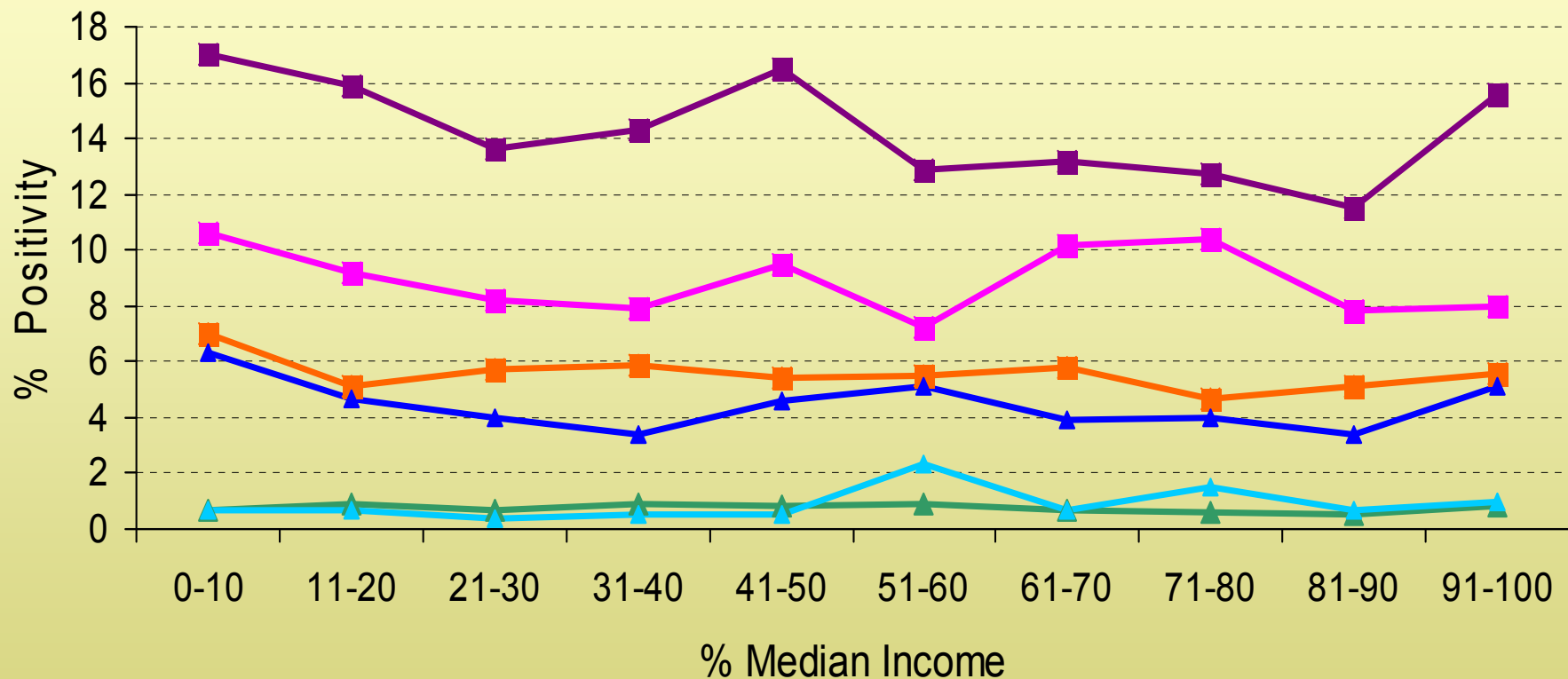


Median Household Income* (Deciles) and STI

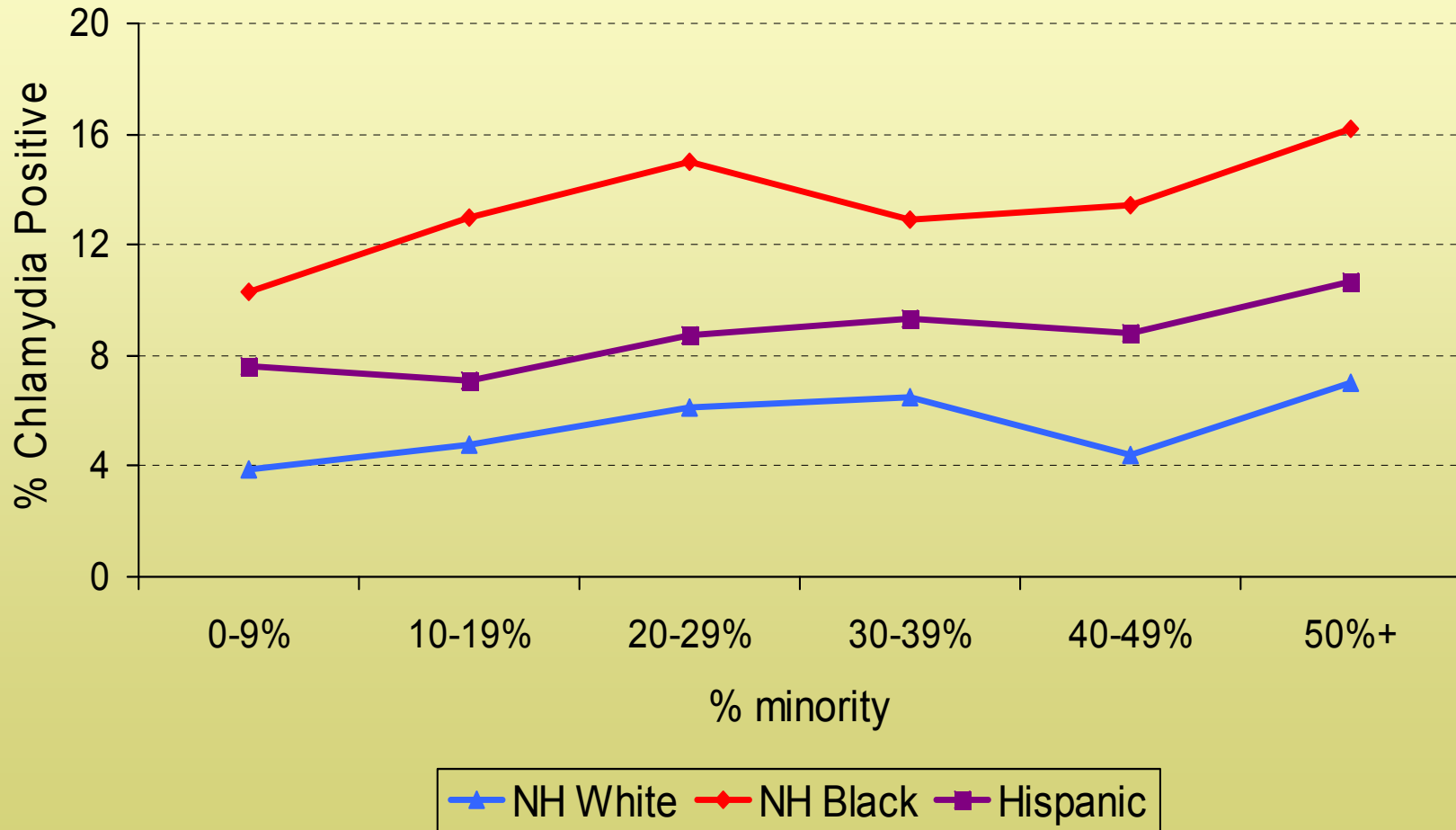


* Deciles based on ABSM values in Census SF3, merged into IPP

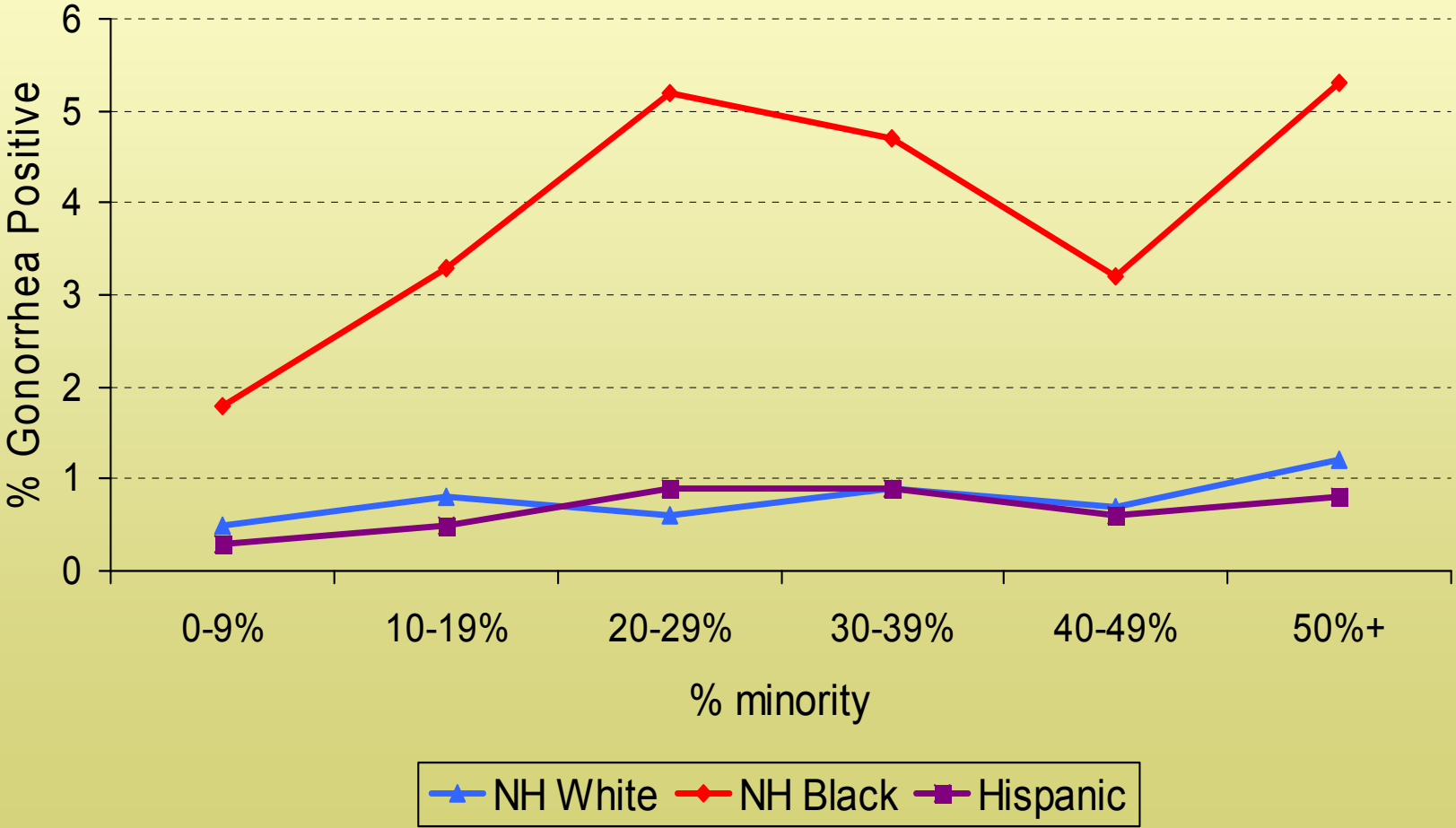
Median Household Income (Deciles), race/ethnicity and STI



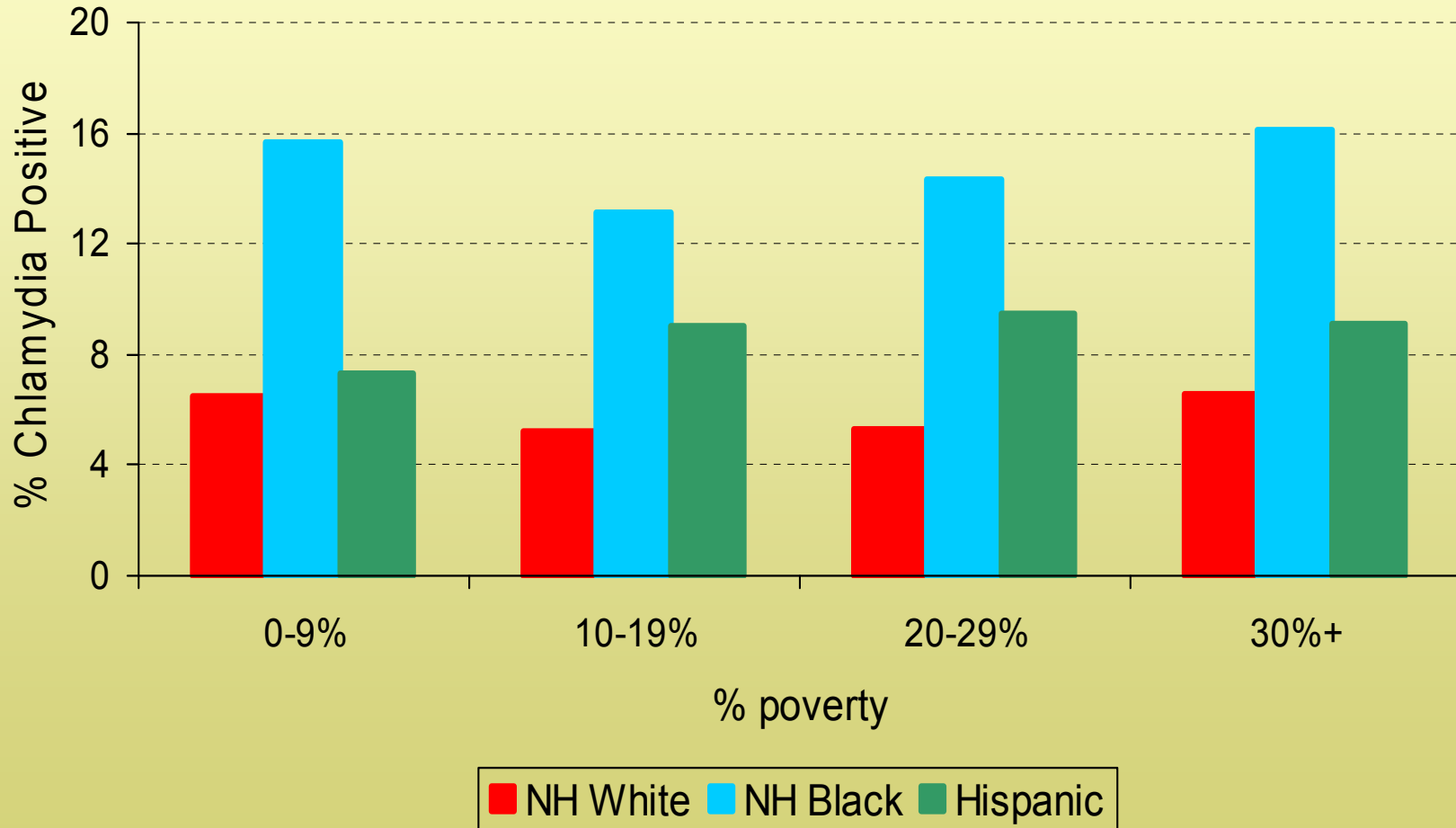
Race/ethnicity, minority community and chlamydia



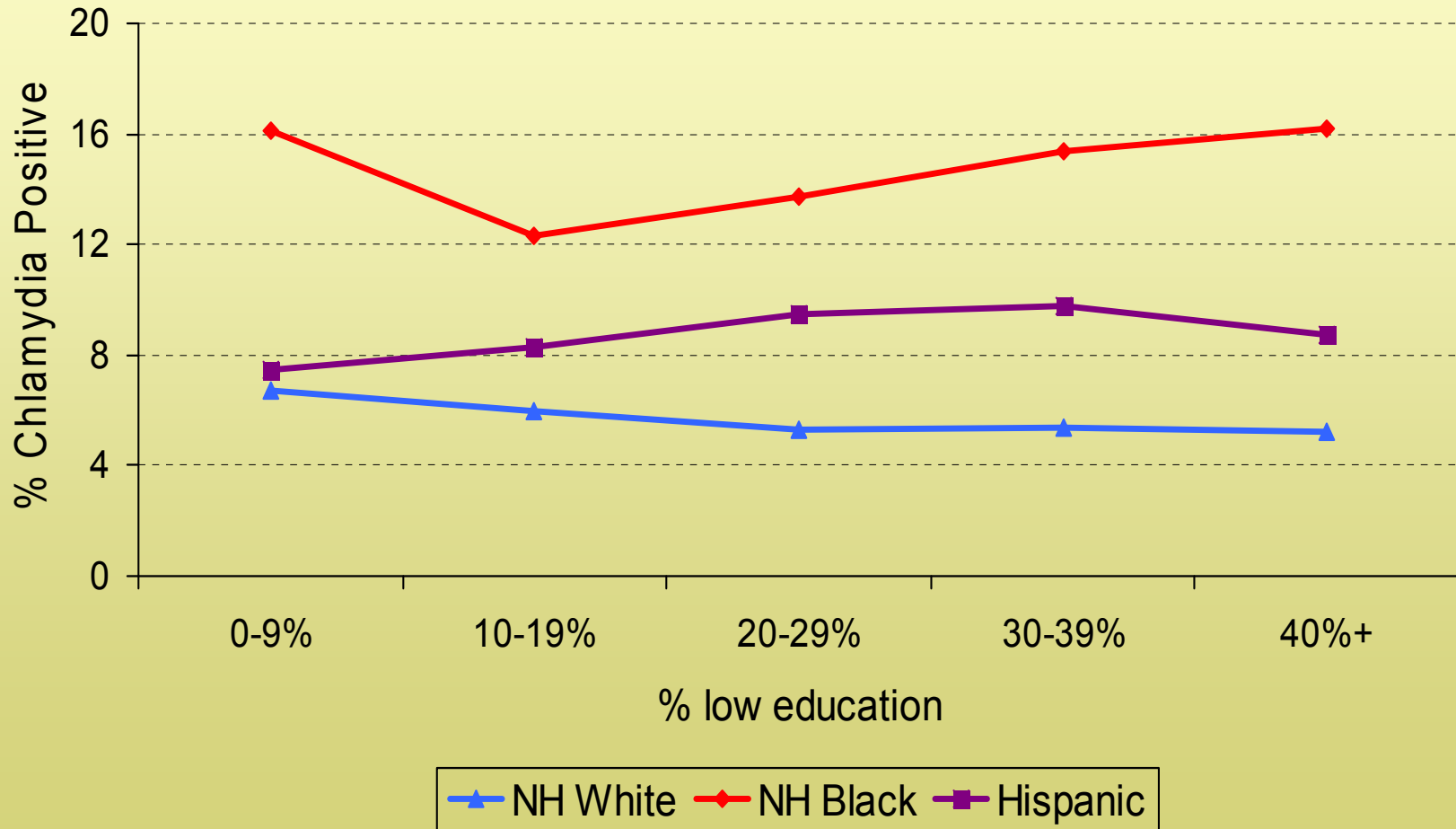
Race/ethnicity, minority community, and gonorrhea



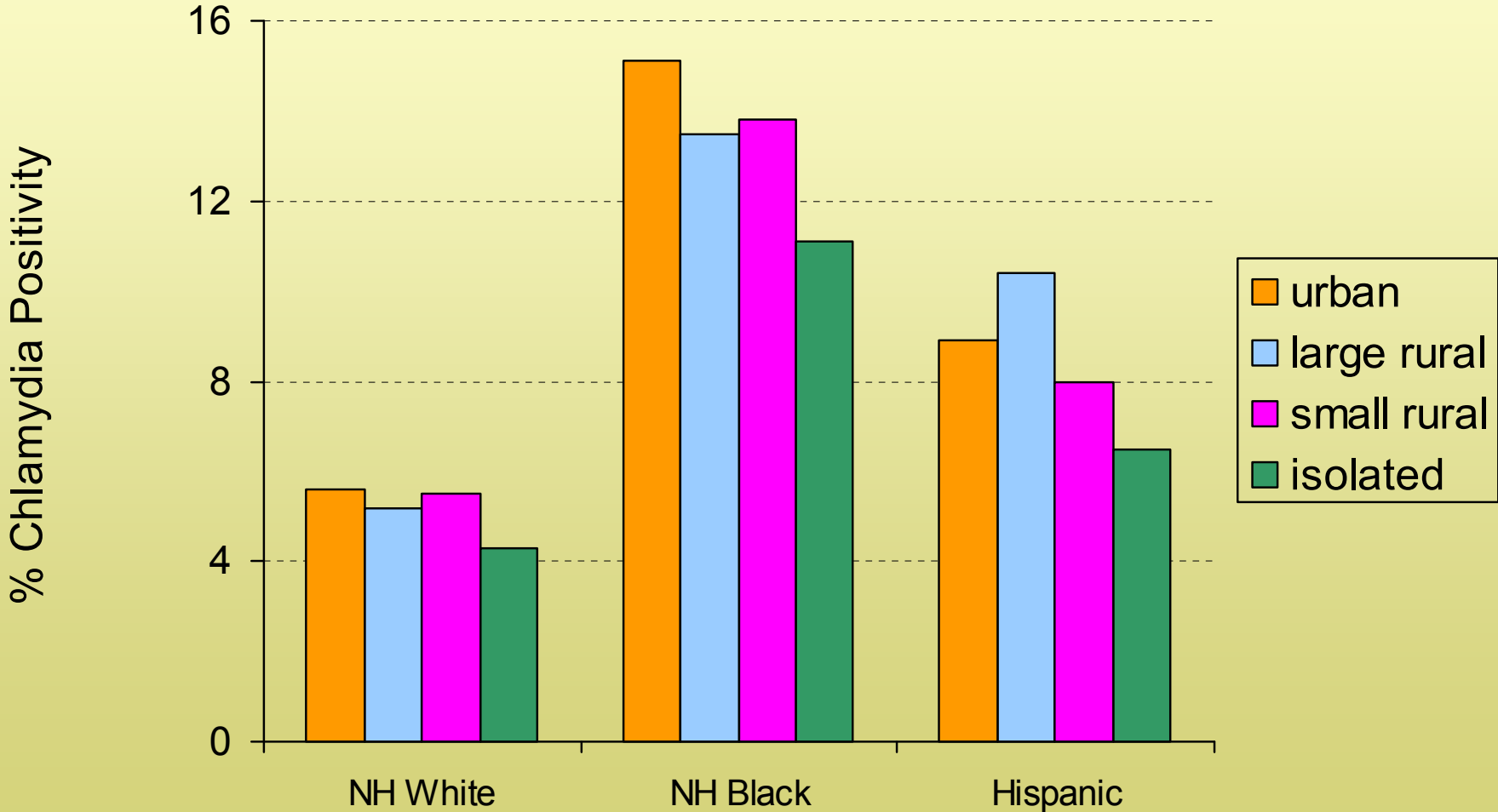
Race/ethnicity, community poverty and chlamydia



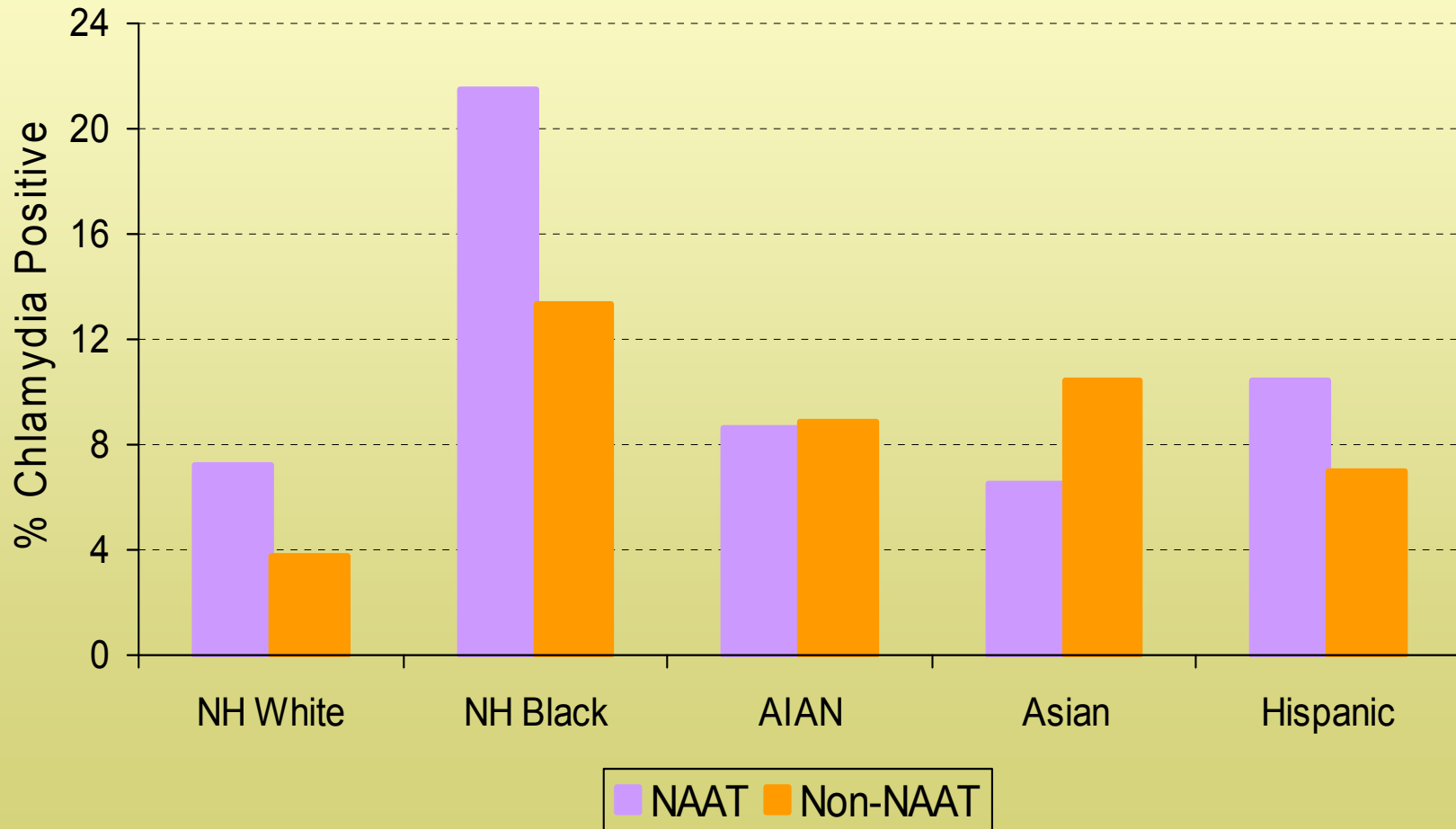
Race/ethnicity, community low educational attainment, and chlamydia



Race/ethnicity, urban-rural and chlamydia



Race/ethnicity, test type, and chlamydia



Limitations

- The potential limitations of using aggregate data include:
 - Summary neighborhood SES measures will not capture individual-level variation;
 - Areal units (e.g. ZCTA) may be revised over time;
 - Attention must be paid to aggregation and disaggregation issues in analysis strategies.

Next Steps

- Phase I—FP, young women: multivariate analyses
- Phase II: Men and women seen at STD clinics

- Dissemination
 - PowerPoint (Phase I) distributed to participants early May for comments/feedback
 - Phase II to be distributed to RIPAC members—May/June—via tables and text summaries
 - CHT finalizing our new website
 - IPP-specific webpages
 - Upload past year's analyses—PowerPoints, conference abstracts
 - Post key project information

Future Issues

- Other factors besides SES contribute to racial/ethnic disparities in health.
- National Longitudinal Study of Adolescent Health—Black young adults were at very high risk for STDs, even when their sexual and substance use behaviors were normative.
- “Racial disparities probably reflect environmental, institutional, and contextual differences between Blacks and Whites”
- Sexual networks?
 - Assortative mixing by race and dissortative mixing by risk group may explain differences in STD and HIV rates.

- The relationship between STDs and behavioral risk patterns must be placed in a broader context
 - Need for more information on young adults' partners and sexual networks to better understand racial differences in STD rates.