## Background

For the past 20 years, the Region X Infertility Prevention Project (IPP) has implemented broad-based screening and treatment for *Chlamydia trachomatis* in U.S. Public Health Service Region X (Alaska, Idaho, Oregon and Washington). The Region X IPP uses uniform selective screening criteria with female clients seen at family planning (FP) clinics. Criteria include testing all female clients ages 24 years or younger on an annual basis. Client demographics, visit reasons, sexual risk behaviors, clinical signs, test type and results are captured via a regional data form.

Racial/ethnic disparities in chlamydia positivity have been evident since the beginning of the project. From 1988 through the mid-1990s CT positivity among female FP clients aged 15 - 24 fell over 60%. This decrease in CT infections was mirrored for all racial/ethnic groups. However, racial/ethnic disparities in CT positivity actually increased during this period. In 1988 CT positivity among non-Hispanic (NH) Black FP clients was about 62% higher than infection levels found among NH White FP clients (16.4% vs. 10.1%, respectively). By 1996, CT positivity was 100% higher among NH Blacks compared to NH Whites (7.0% vs. 3.5%). From 1997 onward, CT positivity increased among Region X FP clients aged 15-24 years. Some factors associated with this shift in trend have been identified, e.g. changes in test technology. However, even after adjusting for behavioral and clinical risk measures associated with CT, positivity was significantly higher in 2004 than it was in 1997 and White/non-White CT differences remained.

Further assessment of racial/ethnic differences in sexually transmitted infections needs to address the well-researched interactions between race/ethnicity and other measures, e.g. 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 context have included household income (family of origin or index client), parents' job classification, parental educational attainment and youth educational aspirations. However, collecting SES indicators on clients during routine clinic services is a challenging goal. Researchers have, therefore, sought alternative strategies for measuring 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). ZCTA are a relatively new areal estimate generated by the U.S. Census Bureau beginning in the mid-1990s. ZCTA are polygons that capture U.S. Postal Service ZIP codes. Areal SES variables are generally referred to as area-based socioeconomic measures (ABSM). The benefit of using ABSM is that summary information about socio-economic status can be based on an individual's address or residential ZIP code and does not rely on individual responses to SES questions. Although the use of ABSM has burgeoned in recent years, theoretical and technical issues have been hotly debated concerning their relevance, validity and utility.

## Objectives

1. Assess chlamydia trends and individual-level risk factors associated with infection among women aged 15-24 years attending Region X FP clinics from 1997-2006;
2. Explore race/ethnic chlamydia differences using area-based socioeconomic measures (ABSM).

## Methods

**Data Sources**

*Infertility Prevention Project chlamydia test records*

We identified Region X IPP family planning clinics that provided testing in at least eight of the 10 years and averaged 50+ tests/year among women aged 15-24 years. The final data set contained 729,068 CT tests from 132 FP Region X IPP clinics participating from 1997 through 2006. All Region X FP clinics used a common medical record form. Information collected included age, race, ethnicity, specimen collection date, clinical findings (ectopy, friable cervix, PID, cervicitis), self-reported sexual risk behaviors (in the past 60 days having had a new sex partner, multiple sex partners, or symptomatic sex partner), having had a sex partner who was diagnosed with CT, condom use during last sex, having had chlamydia in the past year, laboratory test type, and chlamydia test result.

*Area-based socioeconomic measures (ABSM)*

To incorporate aggregate ABSM, we accessed two data sources: 1) U.S. Census 2000 tables geo-coded to ZCTA, and 2) rural-urban commuting area (RUCA) codes. For the former, we downloaded data using the ZCTA as case or record for each Region X state. SES indicators as well as racial/ethnic summaries for each ZCTA included: median household income, percentage of population living at or below 100% of federal poverty level (FPL), percent population age 25 or older without a high school diploma, percent racial minority, and percent Hispanic ethnicity. For the latter data source, a ZIP code RUCA approximation has also been developed. The 10-category RUCA codes for each Region X state's ZCTAs were accessed and then categorized further into four-category and dichotomized measures of urban/rural status. U.S. Census 2000 ZCTA records were merged with the individual CT test records via client's residential ZIP code. Thus, the final data source from IPP contained multi-level data—individual CT tests, along with areal measures of local SES, racial/ethnic make-up, and urban/rural status.

**Laboratory Methods**

In IPP, four state public health laboratories (Alaska, Idaho, Oregon, and Washington), a county health district laboratory (Spokane) and the University of Washington Chlamydia Laboratory performed chlamydia testing for the 132 FP clinics. From 1997 through 2006, these laboratories switched to improved test methods, i.e., nucleic acid amplification technology (NAAT). Over the study period, non-NAATs included: EIAs (MicroTrak II®, Syva and Behring Diagnostic Products, Cupertino, CA); nucleic acid hybridization tests (Pace® 2, Gen-Probe, San Diego, CA); nucleic acid hybridization assays (Hybrid Capture® 2, Digene, Gaithersburg, MD); and cell cultures. The majority of NAATs used in Region X were ligase chain reaction tests (LCx, Abbott, Abbott Park, IL) and target capture transcription-mediated amplification (TMA) assays (Aptima Combo® 2, Gen-Probe, San Diego, CA), along with the latter's first generation NAAT version (TMA).

**Statistical Analyses**

Observed chlamydia positivity was calculated by dividing the number of positive tests by the total number of tests that were either positive or negative. Potential predictors of chlamydial infection were identified by odds ratios and 95% confidence intervals significant at p-value <0.05. Not all test records contained complete data; univariate analyses varied in sample size. Stepwise multivariate logistic regression modeling was used to assess the risk of chlamydial infection for these predictors including demographic characteristics, clinical findings, self-reported sexual risk behaviors, type of laboratory test (NAAT vs. non-NAAT), year of test (a continuous variable coded from 1 to 10 for years 1997 to 2006, respectively), and categorized ABSM. A joint race/ethnicity measure was generated with the following categories: non-Hispanic White, non-Hispanic Black, Asian/Pacific Islander, American Indian/Alaskan Native, and Hispanic. We included interaction terms in the multivariate model to assess whether chlamydia trends over time were comparable for each racial/ethnic group. Analyses were performed using SPSS 11.5 for Windows.

## Results

**Risk Factors and Chlamydia**

*Who was screened for chlamydia?*

Of the 729,068 chlamydia tests performed from 1997 through 2006 about half (49%) occurred in Washington state (Table 1). Twenty-one percent of tests were performed in women aged 15 to 17 years, 26% in women aged 18 to 19 years, and 53% in women aged 20 to 24 years. The majority of tests occurred among NH White women (76%) and in urban areas (79%). A quarter of the sample reported having one or more sexual behavior risks in the past 60 days; 25% also had used a condom during last sex. About 1% of tests involved women reporting exposure to chlamydia as their reason for visit to the clinic. Six percent of tests were in women with clinical findings for chlamydial infection on physical examination. But 19% of sample records had no clinical exam information—either because exams had not been done or data were not available. About 4% of the tests were among women who reported having had a previous chlamydial infection in the past year. Finally, NAATs comprised 52% of all tests done during the 10-year period.

Among ABSM, based on each state's median income within ZIP codes, 12% of tests came from the lowest quartile of median income areas. Alternatively, 5% of tests were from ZIP codes where household median income was under $30,000 and 19% came from neighborhoods with median incomes of $30,000 to $34,999. Eight percent of the study sample resided in areas where household median income was $60,000 or higher. Almost a third (31%) of tests came from ZIP codes where 20% or more of the population were racial minorities; 8% came from areas with 20% or greater Hispanic ethnic population. In terms of educational attainment, 18% of tests came from women who resided in ZIP codes where 20% or more of its adult population did not have a high school diploma.

Table 1 also includes chlamydia positivity for each sample characteristic. Highlighting selected findings, overall CT+ was 5.4% and was higher among adolescents (6.1%) compared to those women aged 20-24 years (4.7%). NH Blacks had the highest CT+ (10.0%), followed by American Indian/Alaskan Natives (9.2%), Asian and Pacific Islanders (7.2%), Hispanics (6.0%), and NH Whites (4.7%). Patients living in urban areas were most likely to test positive for chlamydia (5.6%) compared to large rural (4.7%), small rural (4.5%), and isolated geographic areas (4.1%). Women reporting sexual risk behaviors, having clinical findings or indicating a prior CT infection within the past year were all significantly more likely to test positive for chlamydia. Condom use during last sex was weakly protective (5.1% vs. 5.5%). Among female clients whose reason for visit was known exposure to chlamydia, very high levels of infection were found (27.1%). Finally, CT positivity with NAATs was 6.5% compared to 4.2% using EIA, culture or other non-NAAT laboratory technologies.

For ABSM, chlamydia positivities were generally consistent across categories. For relative levels of household median income, CT+ for the highest quartile was 5.1% compared to 5.8% for women residing in areas with the lowest household income quartile. Income was not linearly associated with chlamydia, ranging from 5.1% in ZIP codes with incomes of $60,000 or higher increasing to 5.5% for tests done in areas with median incomes between $40,000 and $49,999, and then falling to 5.3% in areas with household median values of $30,000 or lower. Regardless of client race or ethnicity, women living in areas with higher proportions of racial/ethnic populations had higher levels of chlamydial infection. A similar pattern held for educational attainment. Patients living in areas with 20%+ adults without high school diplomas had higher infection levels compared to those living in areas with lower levels of limited schooling (6.2% vs. 5.2%).

## Results, cont.

*What was the trend in chlamydia by race/ethnicity over time?*

Unadjusted annual chlamydia positivity rose overall and for each racial/ethnic group from 1997 through 2006. For the total sample, CT+ went from 4.0% (1997) to 5.7% (2006)—a 43% increase. All minority groups had higher CT+ than NH White women throughout the study period. Racial/ethnic CT trends from 1997 to 2006 were: NH White 3.4% to 5.1%; NH Black 6.8% to 10.1%; American Indian/Alaskan Native 6.8% to 7.9%, Asian and Pacific Islander 5.6% to 7.1%, and Hispanic 5.5% to 6.0%.

*What were the independent effects of risk factors on chlamydia positivity?*

Chlamydia positivity was associated with young age, race/ethnicity, having one or more self-reported sexual behavioral risks, having had a sex partner with chlamydia, not using a condom at last sex, having one or more clinical findings, having had a positive chlamydia test in the past year, and use of NAATs. For ABSM, lower household median income, higher percent minority race and Hispanic ethnicity, and higher proportions of adults without high school diplomas were all significantly associated with chlamydial infection. After adjusting for all risk factors, there remained a significant three percent increase in the risk of chlamydia each year (AOR: 1.03; 95% confidence interval: 1.03, 1.04). Racial/ethnic differences were still significant. Relative to NH White FP clients, risk of chlamydial infection was significantly higher for NH Blacks (AOR: 1.83) American Indian/Alaskan Natives (AOR: 1.65), Asian and Pacific Islanders (AOR: 1.33), and Hispanics (AOR: 1.24) (see Table 2).

**Racial/Ethnic Differences**

*Did the distribution of risk factors associated with CT vary across racial/ethnic groups?*

Hispanic subjects were least likely to be adolescents aged 15-19 years (37%) compared to NH Whites (49%), NH Blacks (51%) and American Indian/Alaskan Natives (55%). Where clients lived also differed across groups. NH Black and Asian and Pacific Islander clients were least likely to reside in rural areas (5% and 6%, respectively). NH Whites (24%) and Hispanics (19%) had the highest rural proportions. The summary behavioral risk measure—including new, multiple, or symptomatic SP in past 60 days—varied by race/ethnicity. Hispanics reported the lowest levels of recent behavioral risk (15%) and American Indian/Alaskan Native subjects had the highest (32%). NH White and NH Black sexual risk behavior levels were comparable (26% and 27%, respectively). Another behavioral indicator—condom use last sex—followed a different pattern. Hispanics had the lowest use of condoms (17%), while highest reported use was among NH Blacks (29%). Groups also varied in terms of their history of testing CT positive. NH Blacks reported the highest level of prior infection within the past year (10%), followed by American Indian/Alaskan Native clients (7%). The lowest levels of prior CT infection were found in NH Whites (4%) and Hispanics (4%).

Among ABSM, American Indian/Alaskan Natives were most likely to live in areas with the lowest household income quartile (20%). Asian and Pacific Islander clients were the least likely to live in these poorer neighborhoods (9%). About 71% of NH Blacks and 60% of Asian and Pacific Islanders resided in areas with 20% or more racial minority residents. NH Whites (23%) had the lowest proportion living in these more diverse locales. About a quarter (26%) of the Hispanic sample resided in ZIP codes containing 20% or more Hispanic residents. Finally, 41% of Hispanics lived in areas with high numbers of residents without a high school degree and NH Whites (14%) were least likely to reside in areas with lower educational attainment.

*What were the independent effects of risk factors on CT positivity within racial/ethnic groups?*

Table 3 summarizes step-wise multivariate logistic regression analyses completed within racial/ethnic populations. Among individual-level measures, sexual risk behavior's impact on CT varied by race/ethnicity. For NH Blacks one or more risk behaviors yielded a relatively smaller impact on predicting chlamydial infection. Similarly, no condom use at last sex also showed differences between NH Black FP clients and all other racial/ethnic groups—with the former showing no increased risk of CT if condoms had not been used. Finally, the impact of clients reporting CT infection during the past year was also less of a risk factor among NH Blacks compared to other races/ethnicities. Among ABSM, urban-rural client residence and educational attainment were not factors for any of the racial/ethnic minority groups. For NH Whites predicted CT levels were lower in rural areas and higher in ZCTA where 20+% of adults did not have high school diplomas. Low income was unrelated to CT for all groups except Hispanics. The two racial and ethnic ABSMs yielded disparate results across groups. Residing in areas with higher proportions of racial/ethnic minority residents was a risk factor for CT—particularly for NH Blacks and American Indian/Alaskan Natives. Areas with higher concentrations of Hispanics had higher levels of predicted CT positivity for Hispanics and American Indian/Alaskan Natives. One final measure should be highlighted. Predicted trends in CT positivity over time varied by race/ethnicity. Among NH Whites, there was a 5% annual increase in chlamydia during the 10 years (AOR: 1.05; 95% CI: 1.04, 1.06). Asian/Pacific Islander results also indicated a small, but significant, upward trend in chlamydia (AOR: 1.03; 95% CI: 1.01, 1.05). Results for NH Blacks, American Indian/Alaskan Natives, and Hispanics suggested that chlamydia trends were stable during the study period.

Table 1. Characteristics of women aged 15-24 years and chlamydia positivity in Region X family planning clinics, 1997-2006

| Characteristic | No. | Percent | Chlamydia Positivity |
|---|---|---|---|
| All Women | 729,068 | 100 | 5.4 |
| State | | | |
| Alaska | 31,502 | 4 | 7.1 |
| Idaho | 106,772 | 15 | 5.1 |
| Oregon | 230,619 | 32 | 4.0 |
| Washington | 360,175 | 49 | 6.1 |
| Age group (years) | | | |
| 15-17 | 153,553 | 21 | 6.1 |
| 18-19 | 189,586 | 26 | 6.1 |
| 20-24 | 385,929 | 53 | 4.7 |
| Race/ethnicity | | | |
| NH White | 539,918 | 76 | 4.7 |
| NH African-American | 34,309 | 5 | 10.0 |
| American Indian / Alaskan Native | 8,668 | 1 | 9.2 |
| Asian/Pacific Islander | 31,200 | 4 | 7.2 |
| Other/ Multi | 9,104 | 1 | 7.2 |
| Hispanic | 92,075 | 13 | 6.0 |
| Population density, RUCA ZIP code estimated | | | |
| Urban | 464,427 | 79 | 5.6 |
| Large Rural | 85,045 | 14 | 4.7 |
| Small Rural | 25,218 | 4 | 4.5 |
| Isolated | 14,420 | 2 | 4.1 |
| One or more sexual behavioral risks, past 60 days* | | | |
| No | 530,366 | 75 | 4.3 |
| Yes | 174,474 | 25 | 8.7 |
| Sex partner with chlamydia | | | |
| No | 698,111 | 99 | 5.0 |
| Yes | 9,788 | 1 | 27.1 |
| Condom use, last sex | | | |
| No | 509,533 | 75 | 5.5 |
| Yes | 169,714 | 25 | 5.1 |
| One or more clinical findings† | | | |
| No | 548,942 | 75 | 4.4 |
| Yes | 43,600 | 6 | 14.0 |
| Data not available | 136,526 | 19 | 6.5 |
| Positive chlamydia test, past year | | | |
| No | 667,643 | 96 | 5.0 |
| Yes | 28,987 | 4 | 12.3 |
| Chlamydia test type | | | |
| Non-NAAT | 349,600 | 48 | 4.2 |
| NAAT | 374,699 | 52 | 6.5 |
| Household median income, client ZIP, categorized. Census 2000 | | | |
| Lowest quartile | 71,788 | 12 | 5.8 |
| 26% - 50% | 120,461 | 21 | 5.2 |
| 51%- 75% | 180,650 | 31 | 5.6 |
| Highest quartile | 206,199 | 36 | 5.1 |
| Household median income, client ZIP, categorized. Census 2000 | | | |
| < 30000 | 31,226 | 5 | 5.3 |
| 30000 thru 34999 | 107,079 | 19 | 5.4 |
| 35000 thru 39999 | 127,119 | 22 | 5.2 |
| 40000 thru 44999 | 118,432 | 21 | 5.5 |
| 45000 thru 49999 | 50,390 | 9 | 5.5 |
| 50000 thru 59999 | 98,730 | 17 | 5.4 |
| 60000+ | 46,112 | 8 | 5.1 |
| Percent minority race, client ZIP, Census 2000 | | | |
| < 20% | 445,261 | 69 | 4.8 |
| ≥ 20% | 198,551 | 31 | 6.9 |
| Percent Hispanic ethnicity, client ZIP, Census 2000 | | | |
| < 20% | 594,104 | 92 | 5.3 |
| ≥ 20% | 49,708 | 8 | 6.6 |
| Percent population age 25 or older without a high school diploma, client ZIP, Census 2000 | | | |
| < 20% | 525,104 | 82 | 5.2 |
| ≥ 20% | 118,705 | 18 | 6.2 |

* Includes having had a new sex partner, multiple sex partners, or a symptomatic sex partner in the past 60 days

† Includes cervitis, friable cervix, ectopy, and pelvic inflammatory disease

Table 2. Risk of chlamydial infection in women aged 15-24 years seen in Region X family planning clinics, 1997-2006; univariate and multivariate results

| Characteristic | Univariate | | Multivariate | |
|---|---|---|---|---|
| | OR | 95% CI | AOR | 95% CI |
| Age group (years) | | | | |
| 15-19 | 1.32 | 1.30, 1.35 | 1.31 | 1.28, 1.35 |
| 20-24 | Reference | | Reference | |
| Race/ethnicity | | | | |
| White, Non-Hispanic | Reference | | | |
| Black, Non-Hispanic | 2.06 | 2.17, 2.33 | 1.83 | 1.75, 1.92 |
| American NAK Native | 2.06 | 1.91, 2.21 | 1.65 | 1.52, 1.80 |
| Asian/Pacific Islander | 1.56 | 1.49, 1.63 | 1.33 | 1.26, 1.40 |
| Hispanic | 1.29 | 1.26, 1.33 | 1.24 | 1.19, 1.28 |
| Population density | | | | |
| Urban | Reference | | Reference | |
| Rural | 0.83 | 0.81, 0.85 | 0.91 | 0.88, 0.94 |
| One or more sexual behavioral risks§ | 2.13 | 2.08, 2.17 | 1.91 | 1.87, 1.96 |
| Sex partner with chlamydia | 7.02 | 6.70, 7.34 | 4.25 | 4.03, 4.50 |
| No condom use, last sex | 1.07 | 1.05, 1.10 | 1.17 | 1.14, 1.20 |
| Clinical findings# | | | | |
| None | Reference | | Reference | |
| One or more | 3.55 | 3.44, 3.65 | 3.08 | 2.97, 3.18 |
| No exam, data not available | 1.51 | 1.47, 1.55 | 1.23 | 1.20, 1.27 |
| Positive chlamydia test, past year | 2.64 | 2.54, 2.74 | 1.7 | 1.63, 1.78 |
| Household median income, client ZIP code, categorized. Census 2000 | | | | |
| Lowest quartile | 1.08 | 1.05, 1.11 | 1.06 | 1.02, 1.10 |
| 26% - 100% | Reference | | Reference | |
| % Minority race, client ZIP code, ≥20% | 1.47 | 1.44, 1.51 | 1.11 | 1.08, 1.14 |
| % Hispanic, client ZIP code, ≥ 20% | 1.26 | 1.22, 1.31 | 1.22 | 1.16, 1.28 |
| % Population age 25+ without a HS diploma, client ZIP code, ≥ 20% | 1.20 | 1.17, 1.23 | 1.07 | 1.03, 1.11 |
| Chlamydia test type | | | | |
| NAAT | 1.6 | 1.56, 1.63 | 1.27 | 1.24, 1.31 |
| Non-NAAT | Reference | | Reference | |
| Year since 1997 | 1.04 | 1.03, 1.04 | 1.03 | 1.03, 1.04 |

§ Includes having had a new sex partner; multiple sex partners or a symptomatic sex partner in the past 60 days

# Includes cervitis, friable cervix, ectopy, and pelvic inflammatory disease

Table 3. Risk of chlamydial infection in women aged 15-24 years seen in Region X family planning clinics, 1997-2006; Multivariate results within race/ethnic groups

| Characteristic | NH White | | NH Black | | AN AI | | API | | Hispanic | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N = 539,918 | | N = 34,309 | | N = 8,668 | | N = 31,200 | | N = 92,075 | |
| | AOR[1] | 95% CI[1] | AOR[1] | 95% CI[1] | AOR[1] | 95% CI[1] | AOR[1] | 95% CI[1] | AOR[1] | 95% CI[1] |
| Age group (years) | | | | | | | | | | |
| 15-19 | 1.28 | 1.24, 1.31 | 1.42 | 1.31, 1.54 | 1.59 | 1.34, 1.89 | 1.21 | 1.10, 1.34 | 1.43 | 1.34, 1.52 |
| 20-24 | Ref. | | Ref. | | Ref. | | Ref. | | Ref. | |
| Population density | | | | | | | | | | |
| Urban | Ref. | | Ref. | | Ref. | | Ref. | | Ref. | |
| Rural | 0.89 | 0.86, 0.93 | DNE | | DNE | | DNE | | DNE | |
| One or more sexual behavioral risks§ | 1.92 | 1.87, 1.98 | 1.40 | 1.28, 1.53 | 1.89 | 1.60, 2.24 | 1.93 | 1.73, 2.15 | 2.21 | 2.06, 2.37 |
| Sex partner with chlamydia | 4.69 | 4.39, 5.00 | 2.28 | 1.87, 2.76 | 3.13 | 2.21, 4.44 | 5.99 | 4.85, 7.40 | 3.23 | 2.71, 3.85 |
| No condom use, last sex | 1.21 | 1.17, 1.25 | DNE | | 1.3 | 1.06, 1.58 | 1.16 | 1.03, 1.31 | 1.10 | 1.02, 1.19 |
| Clinical findings | | | | | | | | | | |
| None | Ref. | | Ref. | | Ref. | | Ref. | | Ref. | |
| One or more | 3.25 | 3.11, 3.39 | 2.64 | 2.34, 2.98 | 2.56 | 1.98, 3.30 | 3.86 | 3.38, 4.41 | 2.56 | 2.34, 2.79 |
| No exam, data not available | 1.26 | 1.22, 1.31 | 1.00 | 0.92, 1.11 | 1.26 | 1.04, 1.53 | 1.34 | 1.19, 1.52 | 1.22 | 1.12, 1.32 |
| Positive chlamydia test, past year | 1.88 | 1.78, 1.99 | 1.20 | 1.06, 1.35 | 1.36 | 1.04, 1.79 | 1.69 | 1.43, 1.99 | 1.67 | 1.49, 1.87 |
| Household median income lowest quartile 26% - 100% | DNE | | DNE | | DNE | | DNE | | 1.21<br>Ref. | 1.11, 1.31 |
| % Minority race, client ZIP code, ≥20% | 1.10 | 1.06, 1.14 | 1.37 | 1.25, 1.51 | 1.46 | 1.23, 1.74 | DNE | | DNE | |
| % Population age 25+ without a HS diploma, client ZIP code, ≥ 20% | 1.16 | 1.12, 1.21 | DNE | | DNE | | DNE | | DNE | |
| Chlamydia test type | | | | | | | | | | |
| NAAT | 1.21 | 1.18, 1.25 | 1.37 | 1.24, 1.51 | DNE | | 1.15 | 1.02, 1.31 | 1.56 | 1.46, 1.67 |
| Non-NAAT | Ref. | | Ref. | | Ref. | | Ref. | | Ref. | |
| Year since 1997 | 1.05 | 1.04, 1.05 | DNE | | DNE | | 1.03 | 1.01, 1.05 | DNE | |

Ref: Reference Group

DNE: Did not enter final equation

## Conclusions

From 1997 through 2006, over 700,000 CT tests were performed within the Region X IPP on young sexually active women seen at 132 FP clinics. During those 10 years, chlamydia positivity increased 43%. Racial/ethnic CT differences were consistent and enduring. All minority populations had higher levels of chlamydial infection than NH Whites. We assessed potential reasons for these racial/ethnic differences, including changes in the characteristics of the women screened over time, the use of more sensitive laboratory testing methods, individual-level risk factors, and area-based socioeconomic measures (ABSM). We concluded that racial/ethnic disparities remained after accounting for all other available measures.

There are both common and unique aspects of CT risk profiles across racial/ethnic sub-populations. Groups were relatively comparable on the effects of demographics and clinical signs. However, sexual risk behaviors' relationship to CT varied by race/ethnicity. Compared to other groups, NH Black women's risk behaviors and history of CT positivity were less predictive of their CT test results. Among ABSM, household income and poverty were generally unrelated to CT. In analyses where these SES measures and educational attainment were statistically significant their effects were modest. The utility of the neighborhood racial/ethnic composition ABSM varied across groups and tended to be more important than the SES aggregate indicators.

Finally, all racial/ethnic groups' CT positivity trended upwards over time. However, after adjusting for test type and other individual and aggregate risk factors CT positivity was stable from 1997-2006 for NH Black, American Indian/Alaskan Native, and Hispanic client populations; chlamydial infection levels showed an increase over time for NH White and Asian and Pacific Islander populations.