

PRAMS PERSPECTIVES

A Pregnancy Risk Assessment Monitoring System Report, January 2008

Sexually Transmitted Infections and Other Maternal Infections During Pregnancy

Background

“I thought people like me don’t get these kind of things”—this statement summarizes one of the main themes that emerged from interviews held with women recently diagnosed with chlamydia.¹ Duncan et al. found that prior to diagnosis, women had disassociated themselves with the risk of contracting a sexually transmitted infection (STI). To these women, there had been a preconceived notion that only “seedy people” who hung out at “[the]sort of place, like [where] filthy men go...”¹ were susceptible to what were susceptible to what has become a growing national health crisis.

What is PRAMS?

Data in this newsletter were provided by the Utah Pregnancy Risk Assessment Monitoring System (PRAMS). PRAMS is an ongoing, population-based risk factor surveillance system designed to identify and monitor selected maternal experiences that occur before and during pregnancy and experiences of the child’s early infancy. Each month, a sample of approximately 200 women, two to four months postpartum, is selected. The sample is stratified based on maternal education and infant birth weight so that inferences and comparisons about these groups can be determined. The results are weighted for sample design and non-response.

PRAMS is intended to help answer questions that birth certificate data alone cannot answer. Data will be used to provide important information that can guide policy and other efforts to improve care and outcomes for pregnant women and infants in Utah. Women were asked questions about prenatal care, breastfeeding, smoking and alcohol use, physical abuse, and early infant care.

The PRAMS data reported here represent all live births to Utah residents from 2004-2005. A total of 4,667 mothers were selected to participate in the project and 3,904 mothers responded for an unweighted response rate of 83.7%. Survey results were weighted for non-response so that analyses could be generalized to the entire population of Utah women delivering live births.

Across the nation, the percentage of reported chlamydia cases increased 5.6% among all Americans from 2005 to 2006 (329.4 cases to 347.8 cases per 100,000).² Among U.S. women, the reported chlamydia rate increased 4.8% from 492.2 per 100,000 females to 515.8.³

While Utah’s STI rates are lower than the national average, the concern is the pace at which Utah rates are climbing. For example, overall rates of reported chlamydia cases rose 8.4% from 2005-2006 (182.0 to 197.2 per 100,000). Among Utah women, reported chlamydia rates rose 9.9% during the same period (246.0 to 270.3 per 100,000). Even more striking is the upsurge in reported gonorrhea cases. Since 2001, Utah has experienced the largest increase in gonorrhea cases in the U.S. (290%). Recent rates among women have climbed to 28.9/100,000, representing a 13.4% increase from 2005 to 2006.⁴

Although these increases may be partially attributable to better screening and diagnosis,² the statistics still point to the urgent need to educate Utahns about the ramifications of this health problem, particularly in women of childbearing age.

Further, it is essential to mention that the statistics may be understated since they represent only *reported* cases, and that the true prevalence may be much higher. Many STIs, as well as other maternal infections (such as urinary tract and Group B Strep infections) have been found to be associated with adverse pregnancy outcomes, including ectopic pregnancy, premature rupture of membranes, stillbirth, prematurity, low birth weight, congenital anomalies, infant blindness, infant mental retardation, and postpartum endometritis.⁵⁻¹⁰

There are very few infections in which birth outcomes may not be remedied despite treatment. For example, while there is treatment for genital warts, there is no cure. Further, it is uncertain whether treating genital warts affects the ability to transmit the infection to the infant.¹¹ Other research indicates that while treating bacterial vaginosis during pregnancy is successful in eliminating the infection, the treatment may not be enough to reduce the risk of preterm birth associated with the infection. Joesoef et al. studied the effect of Clindamycin vaginal cream on bacterial vaginosis in a double-blinded, randomized, placebo-controlled trial. Results indicated that the treatment was effective in alleviating the infection; however, it did not reduce preterm birth or low birth weight in this study population.¹² Additionally, a meta-analysis conducted by Tebes et al. discovered inconclusive evidence in the literature regarding the effect of treating bacterial vaginosis on preterm birth, but supported the CDC's current recommendations (discussed later).¹³

Despite the uncertainty of a few exceptions, timely screening, diagnosis, and treatment can prevent the majority of adverse outcomes associated with most STIs and other maternal infections, including infant transmission.¹⁴⁻¹⁶ Yet, in 2006, 10 Utah infants contracted chlamydia, two infants contracted gonorrhea and two contracted syphilis while being born.⁴

Methodology

This report includes PRAMS data from 2004-2005. PRAMS respondents include Utah women who delivered a live birth. Respondents were asked the following question in reference to their most recent pregnancy:

- During your most recent pregnancy, did a doctor, nurse, or other health care worker tell you that you had a urinary tract infection (UTI), a sexually transmitted disease (STD), or any vaginal infection including bacterial vaginosis or Group B Strep (Beta Strep)?

Women who answered YES were followed up with this subsequent question:

- What disease or infection were you told you had? Check all that apply
 - Genital warts (HPV)
 - Herpes
 - Chlamydia
 - Gonorrhea
 - Pelvic inflammatory disease (PID)
 - Syphilis
 - Group B Strep (Beta Strep)
 - Bacterial vaginosis
 - Trichomoniasis (Trich)
 - Yeast infections
 - Urinary tract infection (UTI)
 - Other—please tell us: _____

We selected the most frequently reported infections by PRAMS respondents for our analysis, including: genital warts, chlamydia, Group B Strep, bacterial vaginosis and UTI. We used Chi Squared tests to determine significant demographic and birth outcome markers among women who reported these infections compared to those who did not. Demographic variables included maternal age, education, race, ethnicity, marital status, federal poverty level (FPL), WIC, urban/rural residency, and Medicaid. Birth outcome variables included low birth weight, preterm birth, small for gestational age (SGA), and premature rupture of membranes (PROM). While looking at birth outcome results, we included only women who delivered a singleton baby.

Overall Rates of Infections

Table 1

Percentage of Women Who Reported Maternal Infections During Pregnancy, by Type, Utah PRAMS 2004-2005

Infection	Percentage	Weighted n
Chlamydia	0.9%	888
Genital Warts	0.7%	735
Syphilis	0.03%	32
Gonorrhea	0.04%	37
Herpes	0.4%	403
Pelvic Inflammatory Disease	0.2%	163
Trichomoniasis	0.1%	128
Bacterial Vaginosis	1.2%	1156
Group B Strep	13.4%	13447
Urinary Tract Infection	17.4%	17494
Yeast Infections	7.7%	7713
Other	1.0%	968

Table 1 shows the percentages of all the infections included in the PRAMS survey. The categories are not mutually exclusive, as women were asked to check all that apply. While the actual percentages of respondents reporting STIs appear low, it is important to be aware of the increasing prevalence as mentioned earlier, as well as the adverse outcomes that may occur if proper screening and treatment are not carried out.

The two infections respondents reported most frequently were UTI (17.4%) and Group B Strep (13.4%). Among PRAMS respondents who delivered a term infant, 6.5% reported not being screened for Group B Strep during pregnancy and 10.4% reported not knowing whether they were screened (data not shown). During 2006, there were 17 known Utah infant cases of early-onset Group B Strep that were most likely to have been caused by maternal transmission. There were another 14 infant cases with late-onset that may or may not have been caused by maternal transmission.¹⁷

Table 2

**Percentage of Women Who Reported Maternal Infections During Pregnancy,
by Selected Demographic Variables, Utah PRAMS 2004-2005**

	Chlamydia			Bacterial Vaginosis			Genital Warts			Group B Strep			Urinary Tract Infection		
	Percent	95% CI	P Value	Percent	95% CI	P Value	Percent	95% CI	P Value	Percent	95% CI	P Value	Percent	95% CI	P Value
Total	0.9%			1.2%			0.7%			13.4%			17.4%		
Age			<.0001			<.001			<.001			<.01			<.0001
≤17	6.2% ±	4.0%		4.1% ±	4.1%		3.0% ±	3.0%		7.4% ±	4.7%		22.1% ±	7.6%	
18-19	5.2% ±	3.3%		1.5% ±	2.0%		1.6% ±	2.0%		7.1% ±	3.8%		27.6% ±	6.5%	
20-24	1.3% ±	0.6%		1.7% ±	0.8%		1.0% ±	0.6%		11.8% ±	2.2%		23.1% ±	2.6%	
25-29	0.4% ±	0.4%		1.2% ±	0.7%		0.5% ±	0.4%		13.8% ±	2.3%		15.5% ±	2.3%	
30-34	0.1% ±	0.2%		0.4% ±	0.4%		0.0% ±			16.7% ±	3.4%		12.3% ±	2.7%	
35-39	0.0% ±			0.2% ±	0.3%		1.6% ±	1.7%		14.7% ±	5%		11.1% ±	4.2%	
40+	0.0% ±			0.0% ±			2.1% ±	4.0%		8.6% ±	9.4%		13.8% ±	10.3%	
Education			<.0001			<.05			<.05			<.0001			<.0001
<High School	3.0% ±	1.1%		1.5% ±	0.7%		1.2% ±	0.7%		4.7% ±	1.4%		20.1% ±	2.6%	
High School	1.3% ±	0.7%		1.7% ±	0.8%		1.0% ±	0.6%		11.0% ±	1.8%		24.5% ±	2.5%	
Some College	0.2% ±	0.3%		0.9% ±	0.8%		0.7% ±	0.7%		16.9% ±	3%		15.7% ±	2.9%	
College Graduate	0.0% ±			0.4% ±	0.5%		0.2% ±	0.4%		17.1% ±	3.1%		9.6% ±	2.4%	
Race			NS			NS			<.0001			<.01			NS
White	0.8% ±	0.3%		1.1% ±	0.4%		0.8% ±	0.3%		13.7% ±	1.4%		17.6% ±	1.4%	
Other Than White	1.8% ±	2.2%		2.9% ±	2.8%		0.0% ±			6.7% ±	4.4%		13.3% ±	5.5%	
Ethnicity			<.01			NS			<.001			<.0001			NS
Non-Hispanic	0.6% ±	0.2%		1.1% ±	0.4%		0.8% ±	0.3%		15.2% ±	1.5%		17.6% ±	1.5%	
Hispanic	2.4% ±	1.2%		1.1% ±	0.7%		0.1% ±	0.2%		3.0% ±	1.5%		16.6% ±	2.8%	
Marital Status			<.0001			<.01			<.05			<.0001			0.0001
Married	0.2% ±	0.1%		0.9% ±	0.4%		0.6% ±	0.3%		14.4% ±	1.5%		16.2% ±	1.5%	
Other	4.4% ±	1.5%		2.7% ±	1.2%		1.6% ±	1.0%		8.0% ±	2.2%		23.4% ±	3.2%	
Federal Poverty Level			<.001			NS			NS			<.001			0.0001
≤100% of FPL	2.0% ±	0.8%		2.0% ±	0.9%		1.1% ±	0.7%		9.1% ±	2.2%		22.4% ±	2.9%	
101-133% of FPL	1.5% ±	1.4%		0.8% ±	0.9%		0.3% ±	0.5%		12.0% ±	4.8%		19.0% ±	5.0%	
134-185% of FPL	1.1% ±	0.9%		0.9% ±	0.8%		0.4% ±	0.5%		13.6% ±	3.5%		17.9% ±	3.6%	
185+% of FPL	0.3% ±	0.2%		0.9% ±	0.5%		0.8% ±	0.4%		15.3% ±	1.9%		14.4% ±	1.8%	
WIC			<.0001			<.05			NS			<.01			<.0001
Yes	2.0% ±	0.7%		1.9% ±	0.8%		1.1% ±	0.6%		10.8% ±	2.0%		21.5% ±	2.4%	
No	0.4% ±	0.2%		0.8% ±	0.4%		0.6% ±	0.3%		14.6% ±	1.7%		15.5% ±	1.6%	
Urban/Rural			NS			NS			NS			NS			<.05
Urban	1.0% ±	0.3%		1.1% ±	0.4%		0.7% ±	0.3%		13.8% ±	1.5%		16.4% ±	1.5%	
Rural	0.5% ±	0.4%		1.4% ±	0.9%		0.7% ±	0.6%		12.0% ±	2.6%		20.5% ±	2.9%	
Medicaid Before Pregnancy			<.05			NS			NS			NS			<.05
Yes	3.3% ±	0.2%		2.2% ±	1.7%		0.4% ±	0.5%		13.0% ±	5.1%		24.1% ±	5.6%	
No	0.7% ±	0.3%		1.1% ±	0.4%		0.8% ±	0.3%		13.4% ±	1.4%		17.0% ±	1.4%	
Statistically Significant at the level of Alpha = .05															

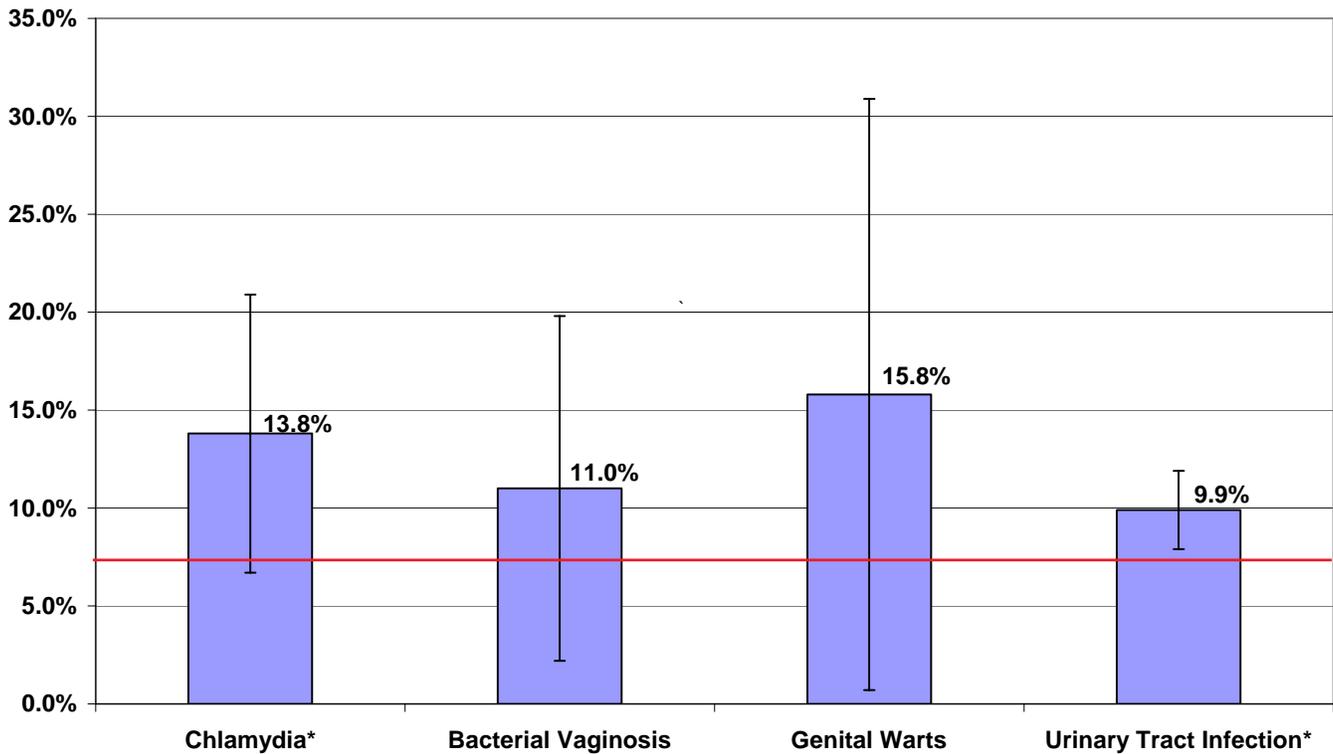
Demographic Markers of Women Who Reported Selected Infections

While the majority of infections shown in Table 2 are reported among the classic high risk populations (younger, less educated, lower FPL, WIC participant, etc), we find the exact opposite when looking at women who reported Group B Strep. These women were more likely to be older, more educated, white, non-Hispanic, married, have higher income and not be on WIC. Research has not clearly identified how Group B Strep is acquired; therefore, we do not understand why the demographic markers are different among the women who report Group B Strep compared to all other infections.

Birth Outcomes

Figure 1

Percentage of Women Who Delivered a Preterm Infant, by Infection Type, Utah PRAMS 2004-2005



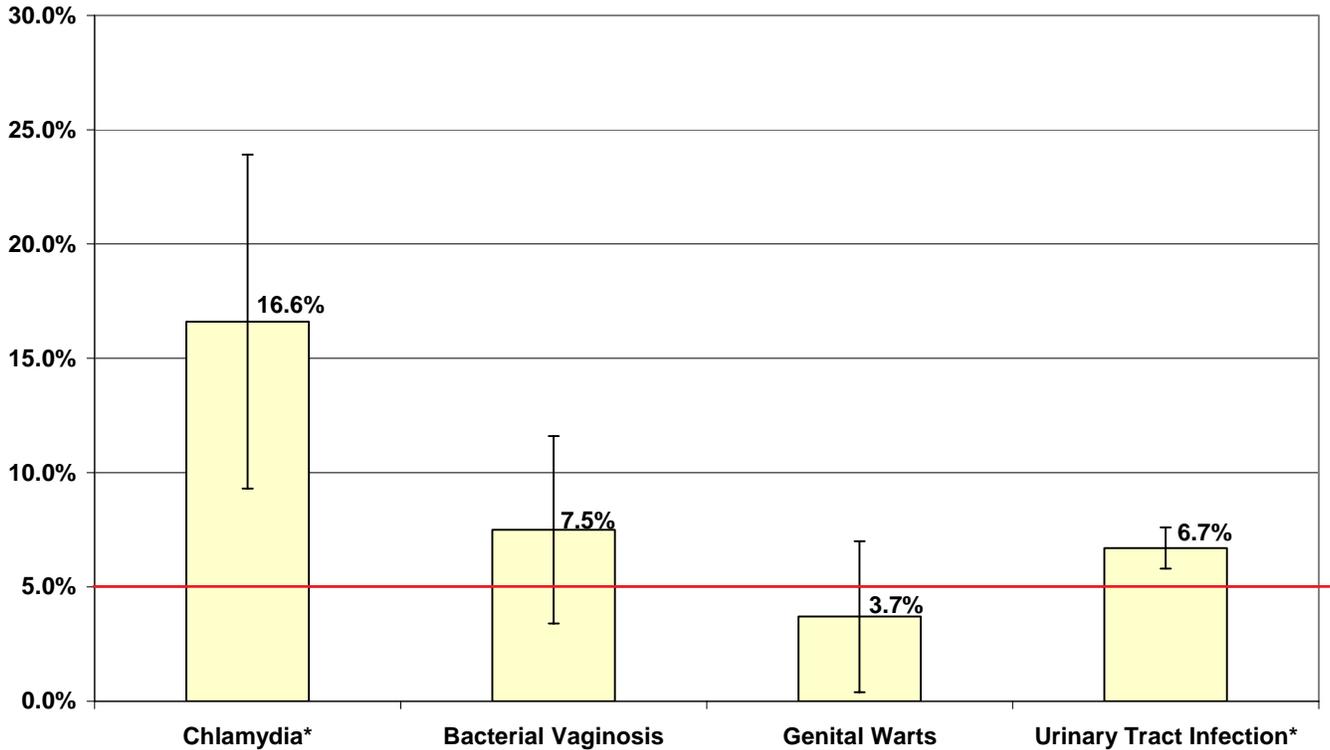
— Percentage of preterm infants among all women (7%)

* Statistically significant at the level of $\alpha = .05$

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**Percentage of Women Who Delivered a Low Birth Weight Infant,
by Infection Type, Utah PRAMS 2004-2005**



— Percentage of low birth weight infants among all women (5%)

* Statistically significant at the level of alpha =.05

Among women who delivered a singleton birth, overall preterm and low birth weight rates were 7.0% and 5.0%, respectively. Figure 1 illustrates that the percentage of premature delivery was higher among every infection category; however, the increase was significant only for women who had reported chlamydia and/or a UTI during pregnancy. As well, Figure 2 shows the same infections as significant indicators of women who deliver low birth weight infants.

Women who reported a UTI were significantly more likely to deliver an SGA infant compared to women who did not (9.9% vs. 7.4%). None of the maternal infections studied in this analysis were statistically significant indicators of PROM.

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Limitations

The data in this report are self reported and limited to women who were told that they had an infection by a health care provider. There may have been other women with asymptomatic infections who were neither screened nor diagnosed.

Among the women who were told that they had an infection, we have no data on whether or not the diagnosis resulted in treatment—which may have impacted the birth outcome findings.

Conclusion/Recommendations

Findings from this analysis indicate that women who were younger, less educated, and unmarried were more likely to report all infections except Group B Strep. Additionally, women who reported chlamydia and/or a UTI were more likely to have had a preterm or low birth weight baby.

The growing number of STIs in Utah women is a call to action for those working in a prenatal care setting, as the majority of these women are of childbearing age. The call is to adhere to screening recommendations that have been issued for pregnant women. A study carried out by Weisbord et al. found that prenatal care providers who practiced in an office that had written policies on screening for infections were much more likely to follow guidelines.¹⁸ Most pregnancy complications and poor pregnancy outcomes associated with STIs and other vaginal infections can be averted with appropriate screening and treatment. Please review the summary of screening guidelines below.

Sexually Transmitted and Other Infections: Screening Recommendations for Pregnant Women

Universal Screening

Universal screening recommendations among pregnant women have been issued for the following infections: HIV, syphilis, hepatitis B, and Group B Strep.^{19,20}

Chlamydia

All pregnant women should be tested for chlamydia in the first trimester and women who are <25 years old or at increased risk should also be screened during the third trimester.²⁰ Guidelines published in a MMWR Report advise repeat testing 3-4 weeks after treatment in all pregnant women who screen positive for chlamydia initially.¹¹

Bacterial Vaginosis

Due to lack of evidence justifying routine screening, the screening recommendation for bacterial vaginosis during pregnancy is based on risk—asymptomatic women with a high risk of delivering prematurely (history of premature birth).²⁰

Gonorrhea

Women who are at risk or who live in an area where the prevalence of gonorrhea is high should be screened during the first prenatal visit. A follow-up test should be done during the third trimester for women who continue to be at risk.²⁰

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