



- **Researcher:**
Laura Bauler, PhD
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*Presenting Author

The Impact of Sexually Transmitted Infections on the Birth Outcomes for Women in Kalamazoo, Michigan Between 2008-2014

Laura Bauler, PhD¹; Catherine Kothari, PhD¹;
Alyssa Woodwyk, MS¹; Duncan Vos, MS¹ and Terra Bautista²

¹ Western Michigan University Homer Stryker M.D. School of Medicine
Division of Epidemiology and Biostatistics

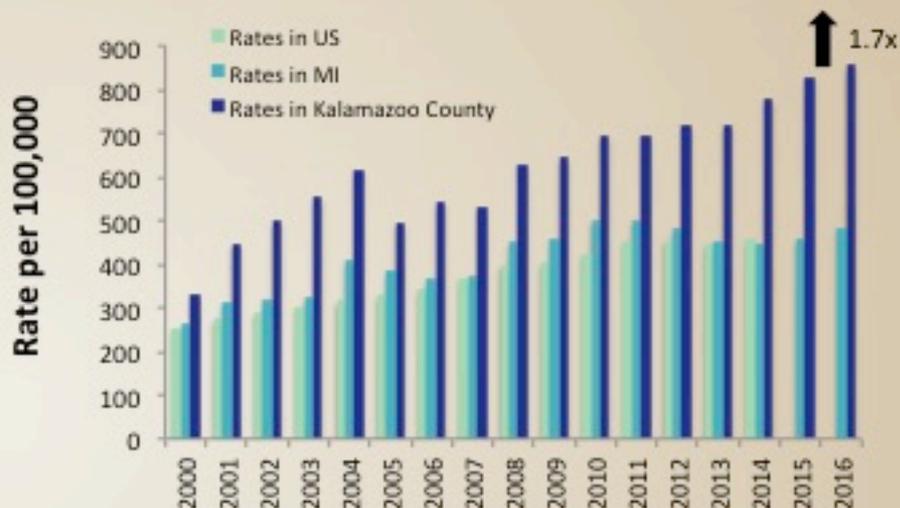
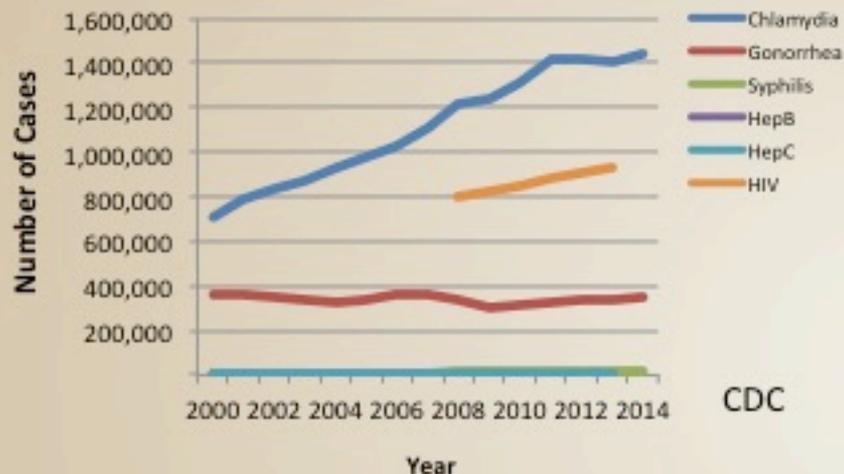
² Kalamazoo County Health and Community Services

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**The authors of this study have no financial conflicts of interest to report.

Background and Rationale

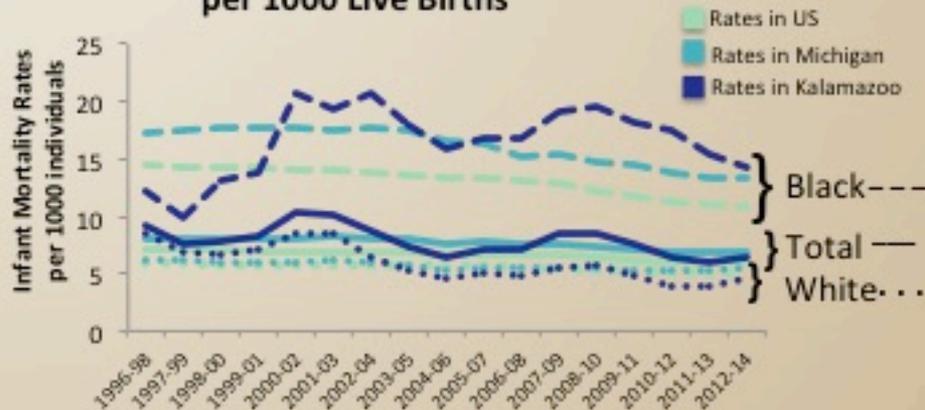


MDHHS, KCHCS

STIs during pregnancy may cause:

- Miscarriage
- Premature rupture of membranes
- Preterm delivery
- Low birth weight
- Birth defects
- Stillbirth
- Newborn infection
- Newborn death

3 Year Moving Average Infant Mortality Rates per 1000 Live Births



Study Question

- Do STIs contribute to the poor birth outcomes for women in Kalamazoo County?



Study Design

- Retrospective case controlled analysis of a longitudinal database
 - Birth records (Kalamazoo County)
 - Linked birth-death records (Kalamazoo County)
 - 2008-2014
- Bivariate analysis for associations
- Multiple Logistic Regression Modeling

Variables in the Database

Outcome:	Poor Birth Outcomes		
	Infant Mortality 0.7%		
	Low Birth weight <2500g		
	Premature birth <37 weeks		
Primary Predictor:	STIs:		
	Chlamydia		
	Gonorrhea		
	Herpes		
	Any STI/ No Infection		
	Group B Strep		
Secondary Predictors:	Obstetric risk factors	Health risk factors	Demographics
	Previous preterm labor	BMI	Race (Black/White)
	Previous PBO	Diabetes	Age
	Vaginal bleeding	Gestational diabetes	Insurance (Private/Medicaid)
	Chorioamnionitis	Hypertension	Hispanic ethnicity
	Premature rupture of membranes	Preeclampsia	Education (HS/College)
	Prenatal care (Kotelchuck)	Tobacco	Marital Status
	Prenatal care in 1 st Trimester	Alcohol	

Sample Population representative of MI and US

Variable:	Kalamazoo	Kalamazoo	Michigan	US
	Count	Percent of births		
Color	4959	22.69	19.76	16.09
White	16893	77.29	75.75	75.73
Hispanic	1348	6.17	6.56	23.23
Age 10-14	30	0.14	0.05	0.06
Age 15-19	1776	8.13	5.61	5.77
Age 20-24	5092	23.30	22.72	21.38
Age 25-29	6790	31.07	31.01	28.96
Age 30-34	5623	25.73	26.86	27.52
Age 35-39	2119	9.69	11.38	13.27
Age 40-44	402	1.84	2.20	2.81
Age 45+	25	0.11	0.17	0.21
Married	12846	58.77	48.50	48.30
Not Married	9011	41.23	49.90	40.30
	Count	Percent of population		
High School Education	19196	87.82	90.10	87.10
College Education	7303	33.41	27.80	30.60
Medicaid	10183	46.59	38.10	34.70
Private	11646	53.28	71.00	67.50

Primary Outcomes

	Count	Percent
PBO	2871	13.1%
Good outcome	18987	86.9%
Infant mortality (in 1st yr)	148	0.7%
Premature <37wks	2261	10.3%
LBW <2500g	1710	7.8%
LBW &/or Premature	2832	13%

Factors significantly associated with PBO

	Bivariate Analysis				
	Good Birth Outcome n=18984	Poor Birth Outcome n=2869	Chi Square p value	OR	95% CI
Primary Predictors: STIs					
Chlamydia	4.37% (830)	7.6% (218)	<.0001	0.5519	.4728, .6442
Gonorrhea	1.11% (211)	2.34% (67)	<.0001	0.4668	.3536, .6162
Herpes	7.32% (1389)	9.24% (265)	0.0002	0.7697	.6706, .8833
Any STI	10.99% (2087)	15.48% (444)	<.0001	0.6689	.5986, .7474
Group B Strep	21.07% (3999)	16.07% (461)	<.0001	1.3807	1.2422, 1.5346

Most variables are significantly associated with PBO

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Demographics:					
Race, Of color	21.32% (4047)	31.79% (912)	<.0001	0.5811	.5332, .6332
Hispanic	6.15% (1168)	6.27% (180)	0.7902	0.9782	.8318, 1.1504
Married	60.27% (11442)	48.93% (1404)	<.0001	1.5848	1.4648, 1.7146
Medicaid	44.93% (8529)	57.65% (1654)	<.0001	0.5995	.5538, .6491
Age 13-24	30.71% (5830)	37.26% (1069)	<.0001		
Age 25+	69.31% (13157)	62.81% (1802)	<.0001	1.338	1.2337, 1.4528
College	34.54% (6558)	25.97% (745)	<.0001	1.5055	1.3778, 1.6451
Health Risk Factors:					
BMI underweight	3.22% (611)	5.19% (149)	<.0001	0.6114	.5063, .7385
BMI overweight	26.37% (5007)	25.69% (737)	0.7955	1.013	.9187, 1.117
BMI obese	26.49% (5028)	25.55% (733)	0.6515	1.0228	.9275, 1.1279
Diabetes	0.47% (90)	0.52% (15)	0.7233	0.9058	0.5236, 1.5669
Gestational diabetes	12.94% (2457)	14.12% (405)	0.0803	0.9039	.8070, 1.0123
Chronic hypertension	1.34% (254)	3.35% (96)	<.0001	0.3915	.3085, .4968
Preeclampsia	4.65% (882)	11.96% (343)	<.0001	0.3586	0.3144, .4090
Alcohol	4.58% (870)	5.12% (147)	0.1917	0.8874	.7417, 1.0618
Tobacco	19.66% (3733)	27.19% (780)	<.0001	0.6548	.5986, .7163
Obstetric Risk Factors:					
Pregnant before	69.15% (13127)	71.59% (2054)	0.0091	0.891	.8170, .9717
Prenatal care in 1st trimester	75.53% (14339)	72.64% (2084)	0.0007	1.165	1.0664, 1.2727
Kotelchuck -inadequate	17.86% (3391)	20.32% (583)	<.0001	0.3668	.3207, .4194
Kotelchuck - intermediate	13.72% (2604)	7.25% (208)	0.0075	0.7894	.6635, .9392
Kotelchuck-adequate plus	34.38% (6546)	55.39% (1589)	<.0001	0.2598	.2315, .2915
Premature rupture of membranes	7.68% (1458)	17.67% (507)	<.0001	0.3871	.3469, .4321
Chorioamnionitis	1.20% (227)	1.08% (31)	0.5943	1.1079	.7597, 1.6158
Prior preterm birth	3.46% (656)	10.18% (292)	<.0001	0.3157	.2734, .3645
Previous bad outcome	1.13% (215)	3.8% (109)	<.0001	0.2899	.2294, .3663
Vaginal bleed	0.37% (70)	2.41% (69)	<.0001	0.1499	0.1072, 0.2095

Women with Chlamydia have a differential risk profile

	Multiple Logistic Regression Model (n=21431)		
	Adjusted OR	95% CI	p value
Primary Predictors: STIs			
Chlamydia	0.799	.672, .949	0.0105
Gonorrhea			
Herpes			
Any STI			
Group B Strep	1.464	1.307, 1.639	<.0001
Demographics:			
Race, Of color	0.657	.594, .727	<.0001
Medicaid	0.7	.635, .771	<.0001
Age 13-24			
Health Risk Factors:			
BMI underweight	0.688	.560, .846	0.0004
BMI overweight	1.062	.956, 1.179	0.2626
BMI obese	1.296	1.164, 1.443	<.0001
Chronic hypertension	0.434	.335, .563	<.0001
Preeclampsia	0.34	.294, .392	<.0001
Tobacco	0.822	.741, .912	<.0001
Obstetric Risk Factors:			
Pregnant before			
Kotelchuck -inadequate	0.413	.358, .475	<.0001
Kotelchuck - intermediate	0.8	.669, .957	0.0146
Kotelchuck -adequate plus	0.265	.235, .299	<.0001
Premature rupture of membranes	0.32	.284, .360	<.0001
Prior preterm birth	0.477	.401, .567	<.0001
Previous bad outcome	0.554	.416, .737	<.0001
Vaginal bleed	0.177	.121, .258	<.0001

Conclusions

- Chlamydia infection is significantly associated with birth outcomes (GBO, OR=0.799)
- Women infected with Chlamydia have a different risk factors that predict birth outcomes. (Medicaid, age and prior bad outcomes)

Implications

- CDC: Chlamydia screening for pregnant women at first prenatal visit:
 - All women <25 years
 - >25 years if at increased risk
 - New sex partners, more than 1 partner, partner with STI
 - Retested in 3rd trimester for women <25 or at increased risk
 - Test of cure 3-4 weeks after treatment and at 3 months
- Our work supports these screening guidelines
- In our community, it may improve birth outcomes to also screen pregnant women who are on Medicaid

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Cathy Kothari

Healthy Babies Healthy Start

In Kalamazoo, Michigan

Terra Bautista



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Biostatistician



Alyssa Woodwyk
Biostatistician



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