

Racial Disparity and Preterm Birth

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Disclaimers

- No agenda, no offense intended

Terminology

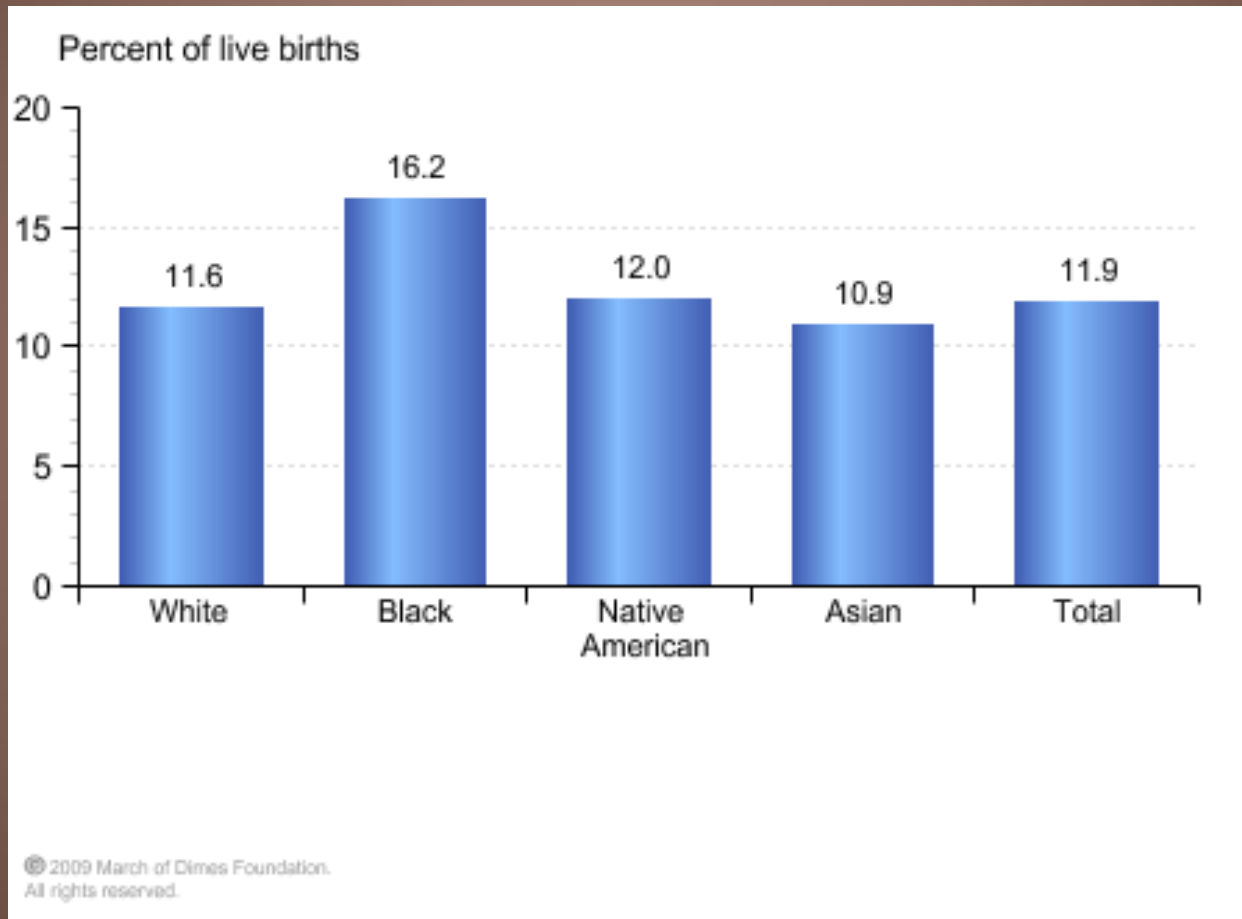
- Race
- Ethnicity
- Inconsistencies in the scientific literature

Racial Disparity and Preterm Birth

- Differences between non-Hispanic Blacks and other women in terms of preterm birth and resulting outcomes are:
 - Quantitatively Significant
 - Well documented
 - Largely unexplained

Preterm by race

Kansas, 2004-2006 Average

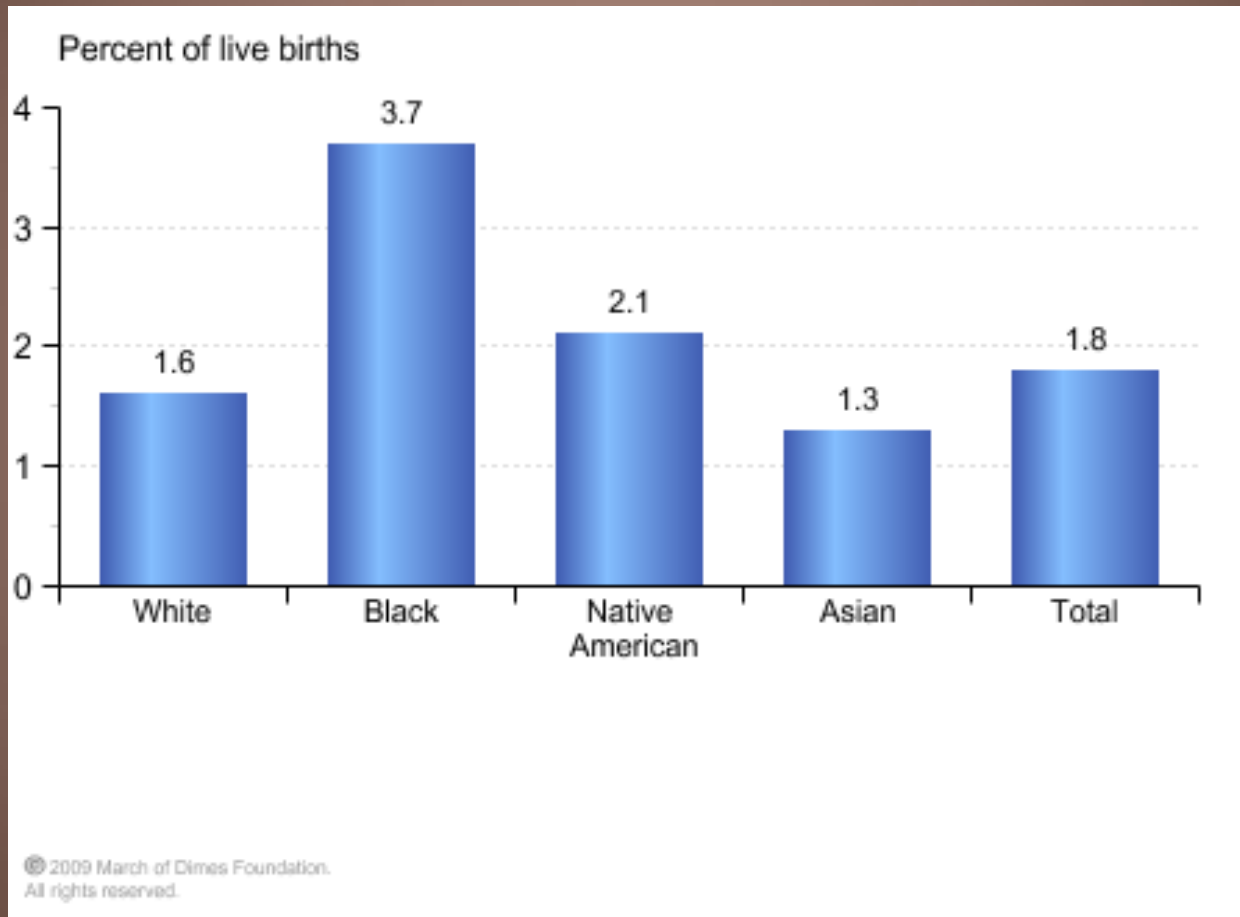


Preterm is less than 37 completed weeks gestation.

Source: National Center for Health Statistics, final natality data. Retrieved October 1, 2009, from www.marchofdimes.com/peristats.

Very preterm by race

Kansas, 2004-2006 Average

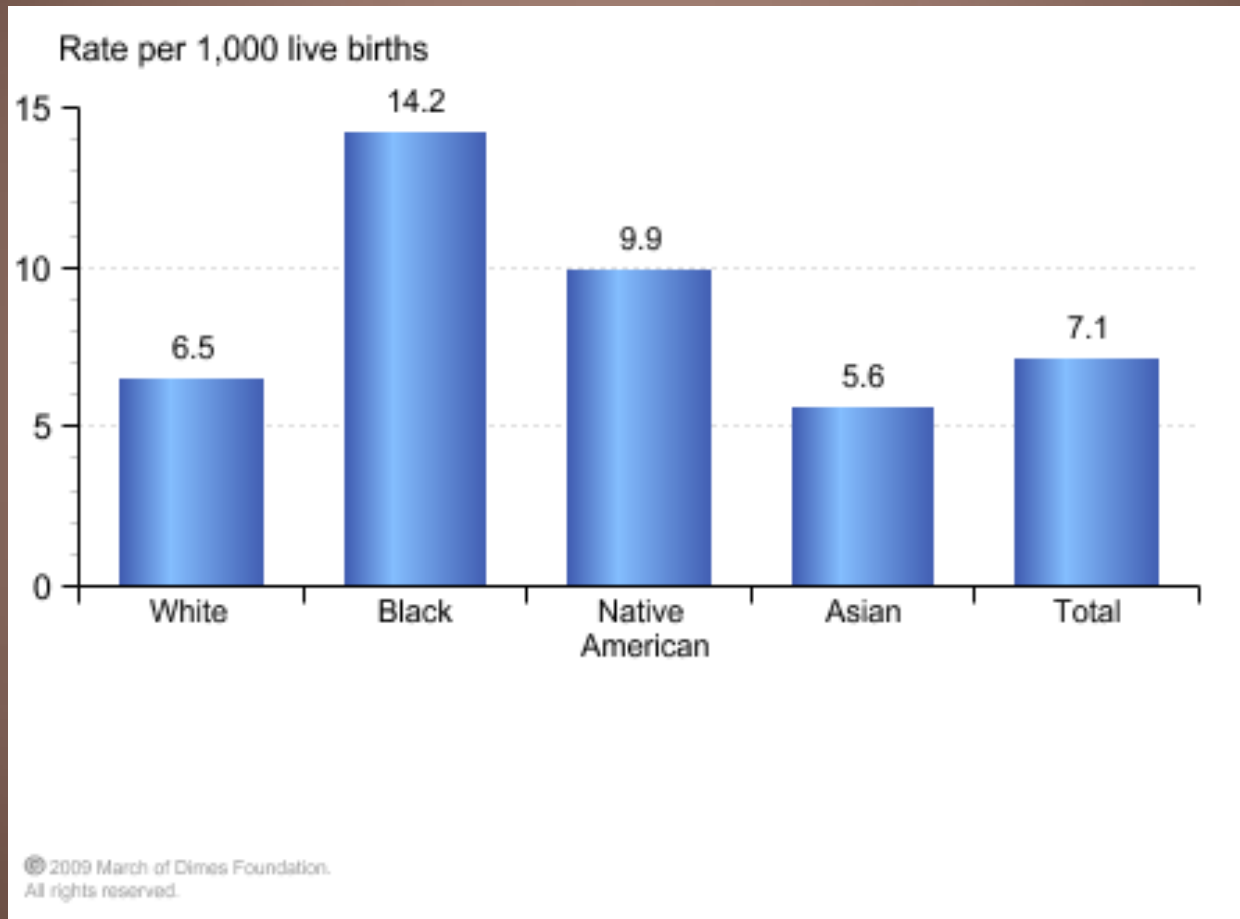


Very preterm is less than 32 completed weeks gestation.

Source: National Center for Health Statistics, final natality data. Retrieved October 1, 2009, from www.marchofdimes.com/peristats.

Infant mortality rates by race

Kansas, 2003-2005 Average



An infant death occurs within the first year of life.

Source: National Center for Health Statistics, period linked birth/infant death data. Retrieved October 1, 2009, from www.marchofdimes.com/peristats.

Racial Disparity – Causes

- Access to health care
- Social/Demographic factors
- Medical factors
- Behaviors
- Genetics
- Stress

Racial Disparity – FASTER Trial

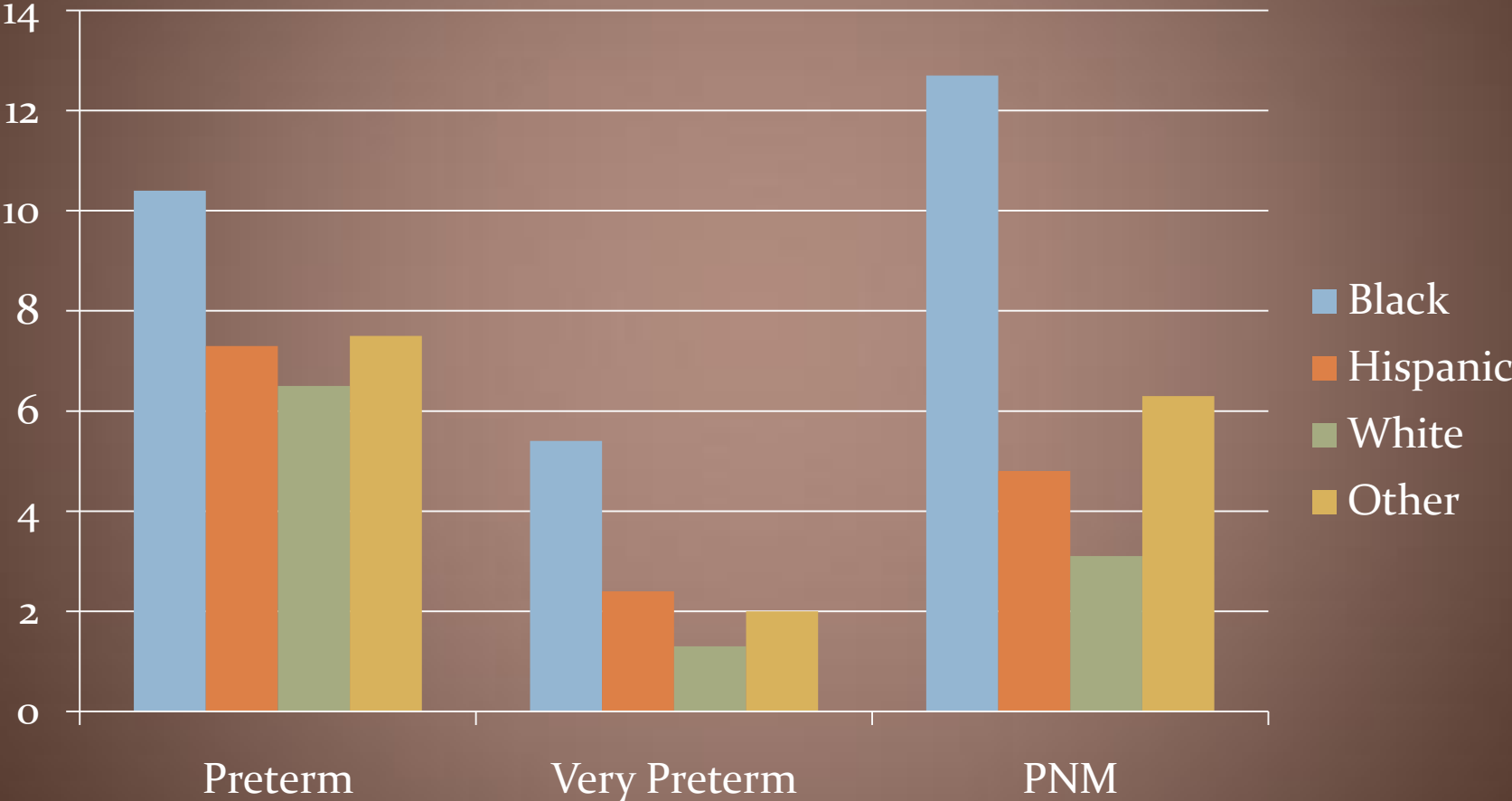
all with early prenatal care

Table 2. Frequency of Pregnancy Complications by Race

Characteristic	Black (n = 1,803)	Hispanic (n = 7,762)	White (n = 24,221)	Other (n = 1,743)	<i>P</i> *
IUGR	31 (1.7)	101 (1.3)	242 (1.0)	21 (1.2)	< .009
Gestational hypertension	96 (5.3)	225 (2.9)	1211 (5.0)	61 (3.5)	< .001
Preeclampsia	67 (3.7)	210 (2.7)	484 (2.0)	38 (2.2)	< .001
Preterm labor	99 (5.5)	272 (3.5)	1356 (5.6)	91 (5.2)	< .001
Preterm PROM	49 (2.7)	140 (1.8)	363 (1.5)	31 (1.8)	< .002
Gestational diabetes	83 (4.6)	349 (4.5)	678 (2.8)	120 (6.9)	< .001
Placental abruption	13 (0.7)	31 (0.4)	194 (0.8)	14 (0.8)	< .003
Placenta previa	13 (0.7)	47 (0.6)	121 (0.5)	17 (1.0)	< .090
Preterm birth [†]	188 (10.4)	567 (7.3)	1574 (6.5)	131 (7.5)	< .001
Very preterm birth [‡]	97 (5.4)	186 (2.4)	315 (1.3)	35 (2.0)	< .001
Cesarean delivery	526 (29.2)	2065 (26.6)	5353 (22.1)	450 (25.8)	< .001
Light bleeding [§]	274 (15.2)	1025 (13.2)	3003 (12.4)	230 (13.2)	< .001
Heavy bleeding	40 (2.2)	186 (2.4)	315 (1.3)	31 (1.8)	< .001

Racial Disparity – FASTER Trial

n= 35000
all with early care



Racial Disparity – Causes

- Access to health care
 - Disparity persists with early care
- Social/Demographic factors
- Education
- Medical factors
- Behaviors
- Infections
- Genetics
- Stress

Socioeconomic Factors

- Socioeconomic risks similar in indigent black and non-black population in rural Alabama (Goldenberg, 1994)
- As income levels rise, rates of preterm birth decrease, but racial disparity persists

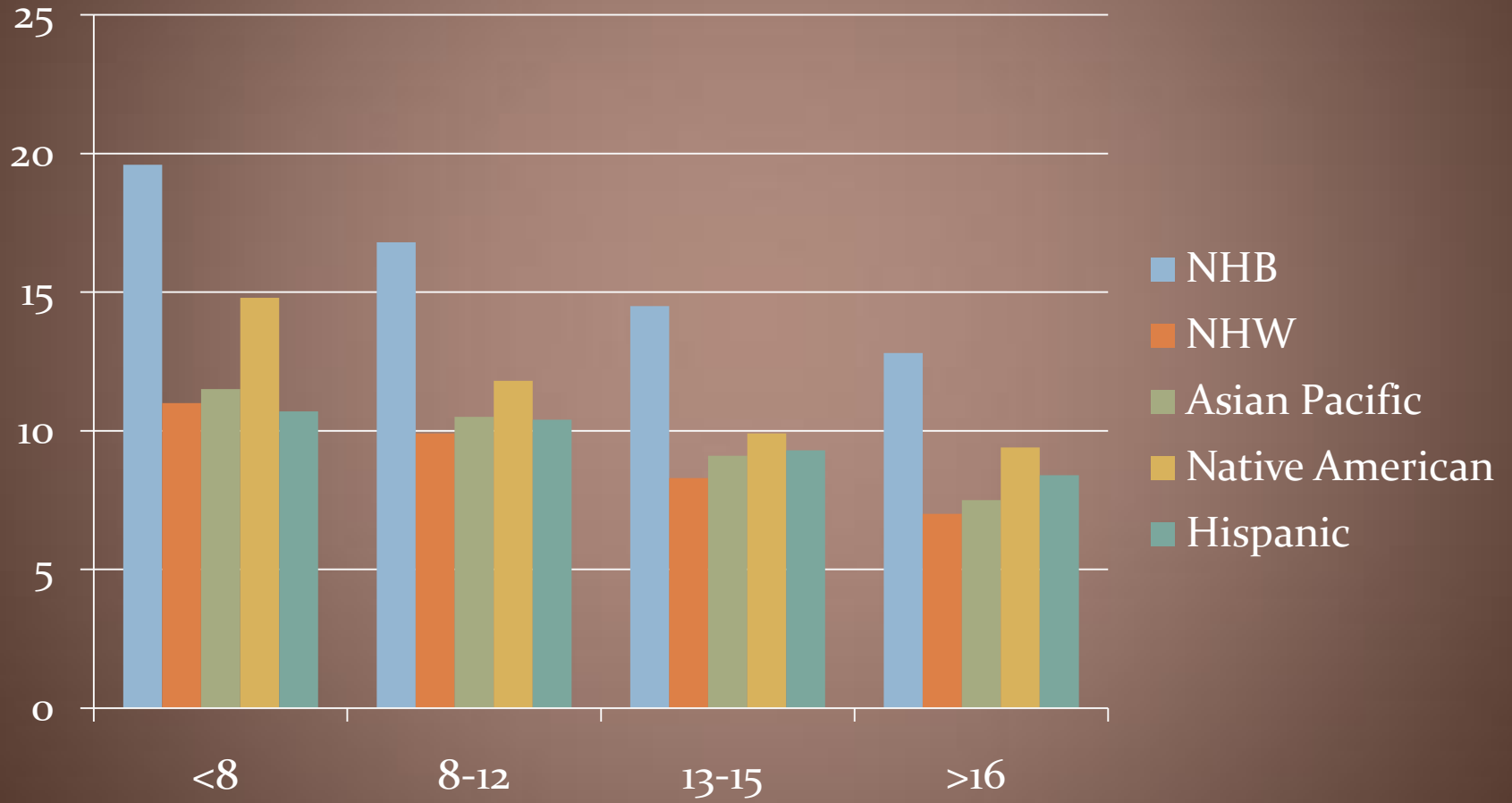
Racial Disparity – Causes

- Access to health care
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- Social/Demographic factors
 - Disparity persists after adjustment
- Education
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Preterm Birth – Education and Race

Years of Education	NHB	NHW	Asian Pacific	Native American	Hispanic
<8	19.6	11.0	11.5	14.8	10.7
8-12	16.8	9.9	10.5	11.8	10.4
13-15	14.5	8.3	9.1	9.9	9.3
>16	12.8	7.0	7.5	9.4	8.4

Preterm Birth – Education and Race



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Medical Causes

- Anemia
 - Not different (Cohan 2001)
- Nutrition
 - Not different (Klebanoff 2001)
- Smoking, alcohol
 - Not different (Goldenberg 1996)
- Infection
 - Is different (Fiscella 1996)

Infection – Race and Preterm Birth

Chlamydia, Trichomonas, Bacterial Vaginosis

Table 4. Proportion of preterm birth associated with genital infection, stratified by racial group

	Preterm birth rate		Prevalence of infection	Total preterm birth rate	Population-attributable risk
	Infection present	Infection absent			
African American	7.9%	5.1%	47.2%	6.4%	20.7%
Hispanic	5.1%	3.3%	24.5%	3.8%	11.6%
White	5.5%	4.2%	17.0%	4.4%	5.0%

Preterm Birth – Infection and Race

- Infection may be responsible for part of racial disparity (<30%)
- Remember BV metronidazole trial

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- Education
 - Disparity persists
- Medical factors
 - Infection may explain 30%
- Behaviors
- Infections
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Behaviors – Racial Difference

- Sexual practices, frequency
 - Not different
- Pregnancy spacing
 - Not different
- Douching more frequent in NHB population
 - Might explain increase BV

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 - Behaviors not different
- Genetics
- Stress

Reasons to suspect genetic component to preterm birth

- Other known factors don't account for race disparity
- Recurrence pattern
- Familial pattern
- Twins offspring have increased PTB risk

Genetics and Preterm Birth

- Preterm birth is associated with inflammation and/or infection of maternal and fetal tissues with measurable changes in cytokine production
- Gene Polymorphisms of Inflammatory Cytokines
 - 2-4x more gene polymorphisms for IL-1 and IL-6, TNF-alpha in black population – increased inflammation
- Gene-environment interaction
 - TNF-alpha and BV

Allostasis

- The concept of allostasis, maintaining stability through change, is a fundamental process through which organisms actively adjust to both predictable and unpredictable events...
- Allostatic load refers to the cumulative cost to the body of allostasis, with allostatic overload... being a state in which serious pathophysiology can occur...

Stress, Allostasis and Illness

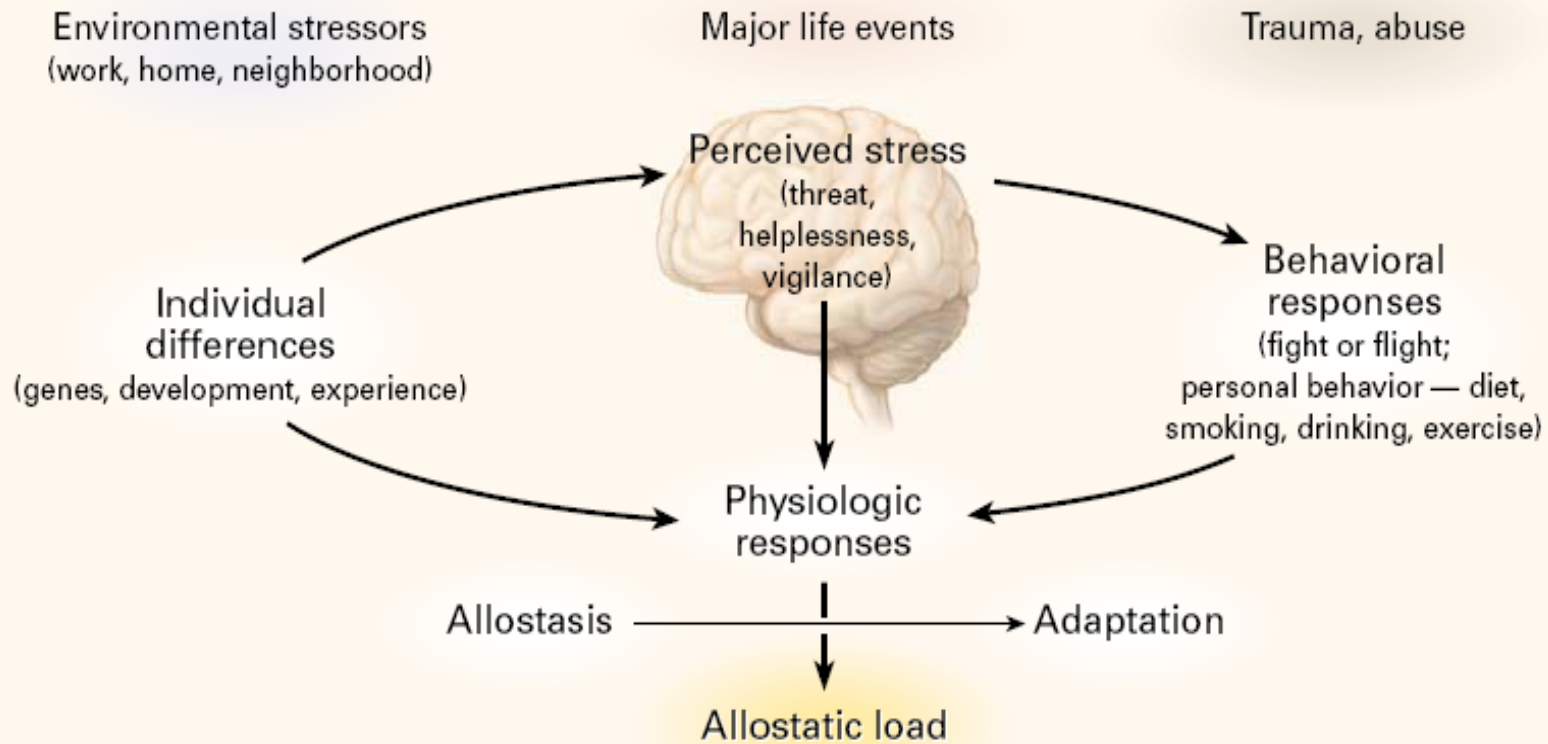


Figure 1. The Stress Response and Development of Allostatic Load.

The perception of stress is influenced by one's experiences, genetics, and behavior. When the brain perceives an experience as stressful, physiologic and behavioral responses are initiated, leading to allostasis and adaptation. Over time, allostatic load can accumulate, and the overexposure to mediators of neural, endocrine, and immune stress can have adverse effects on various organ systems, leading to disease.

Chronic Stress

- Prolong wound healing
- Alter WBCs
- Associated with BV in pregnancy
- Increase reactivation of genital herpes
- Decrease immune response to vaccines
- Increase susceptibility and severity of clinical infection
- Increase cytokines IL-1, IL-6, TNF-alpha

Health Risks in African-Americans

- More preterm birth, LBW, VLBW
- More heart disease
- More Hypertension
- More Diabetes
- More obesity

Do African-American women live with more chronic stress?

Racial Discrimination and Very Low Birthweight

TABLE 2—Maternal Exposure to Interpersonal Racial Discrimination and Infant Very Low Birthweight

	Reported Racial Discrimination Incidents							
	Lifetime				This Pregnancy			
	Percentage (No.) VLBW n=104	Percentage (No.) NLBW n=208	OR	95% CI	Percentage (No.) VLBW n=10	Percentage (No.) NLBW n=2088	OR	95% CI
Finding a job	29 (30)	13 (25)	3.0	1.6, 5.4	2 (2)	1 (3)	1.3	0.2, 8.1
At work	24 (25)	14 (29)	2.0	1.1, 3.5	4 (4)	5 (10)	0.8	0.2, 2.6
At school	18 (19)	11 (22)	1.9	1.0, 3.7	2 (2)	2 (4)	1.0	0.2, 5.6
In public settings	37 (38)	29 (61)	1.4	0.8, 2.3	13 (14)	15 (31)	0.9	0.5, 1.8
Getting medical care	5 (5)	5 (11)	0.9	0.3, 2.7	4 (4)	2 (4)	1.6	0.4, 6.2
≥1 domains	56 (58)	40 (83)	1.9	1.2, 3.1	19 (20)	20 (42)	0.9	0.5, 1.7
≥2 domains	41 (32)	25 (41)	2.1	1.2, 3.8	6 (6)	4 (8)	1.5	0.5, 4.4
≥3 domains	30 (20)	12 (17)	3.2	1.5, 6.6	0 (0)	1 (2)

Note. VLBW = very low birthweight; NLBW = non-low-birthweight; OR = odds ratio; CI = confidence interval.

Stress, Race and Preterm Birth

- Discrimination leads to chronic stress
- Alters the immune system, affects health
- May partly explain racial disparities in preterm birth
- No easily solutions

Importance of Understanding Racial disparities in Preterm Birth

- Help vulnerable populations
- Aid in understanding of pathophysiology of preterm birth
- Insights into roles of:
 - Genetics
 - Infection
 - Inflammation
 - Sociodemographic factors
 - Stress