



**BIOPSYCHOSOCIAL CONTRIBUTORS  
TO RACIAL DISPARITIES IN  
ADVERSE BIRTH OUTCOMES**

**Tyan Parker Dominguez, PhD, MPH, MSW  
School of Social Work  
University of Southern California**

# OBJECTIVES

- 1) Discuss stress paradigm and links to adverse health outcomes**
- 2) Describe ethnic differences in lifetime exposure and impact on outcomes in pregnancy**
- 3) Identify physiological mechanisms**

# Persistent Racial Disparity

*African-Americans have the highest **infant mortality rate** and the highest rates of **low birthweight** and **preterm delivery** of all racial and ethnic groups in this country*



# RELATED SEQUELAE

- **In childhood:**  
**Cerebral palsy, epilepsy, chronic lung disease, deafness, blindness, ADHD, cognitive deficits, learning disabilities**
- **In adulthood:**  
**Cardiovascular disease, diabetes, hypertension (Barker thesis)**

# Intergenerational Perpetuation of Risk

## MOTHER

- Birthweight
- Gestational age



## INFANT

- Birthweight
- Gestational age
- Fetal Growth
- Gestational age

# Disparity not explained by established

*Sociodemographic*

*Behavioral*

*Medical*

**risk factors**



*Berkowitz & Papiernik, 1993; Collins & David, 1990; David & Collins, 1991; Frisbie, Biegler, de Turk, Forbes, & Pullum, 1997; Kleinman & Kessel, 1987; Shiono, Klebanoff, Graubard, Berendes, & Rhoads, 1986; Wise, 1993*

# *Psychosocial Stress*

**Environmental demands that tax or exceed the adaptive capacity of an organism, resulting in physiological and psychological changes that may place the organism at risk for disease**



*Cohen, Kessler, & Gordon, 1995*

# THE EVIDENCE



**Stressful life events**

**Events distress**

**Perceived stress**

**State anxiety**

**Pregnancy anxiety**



**Birthweight**

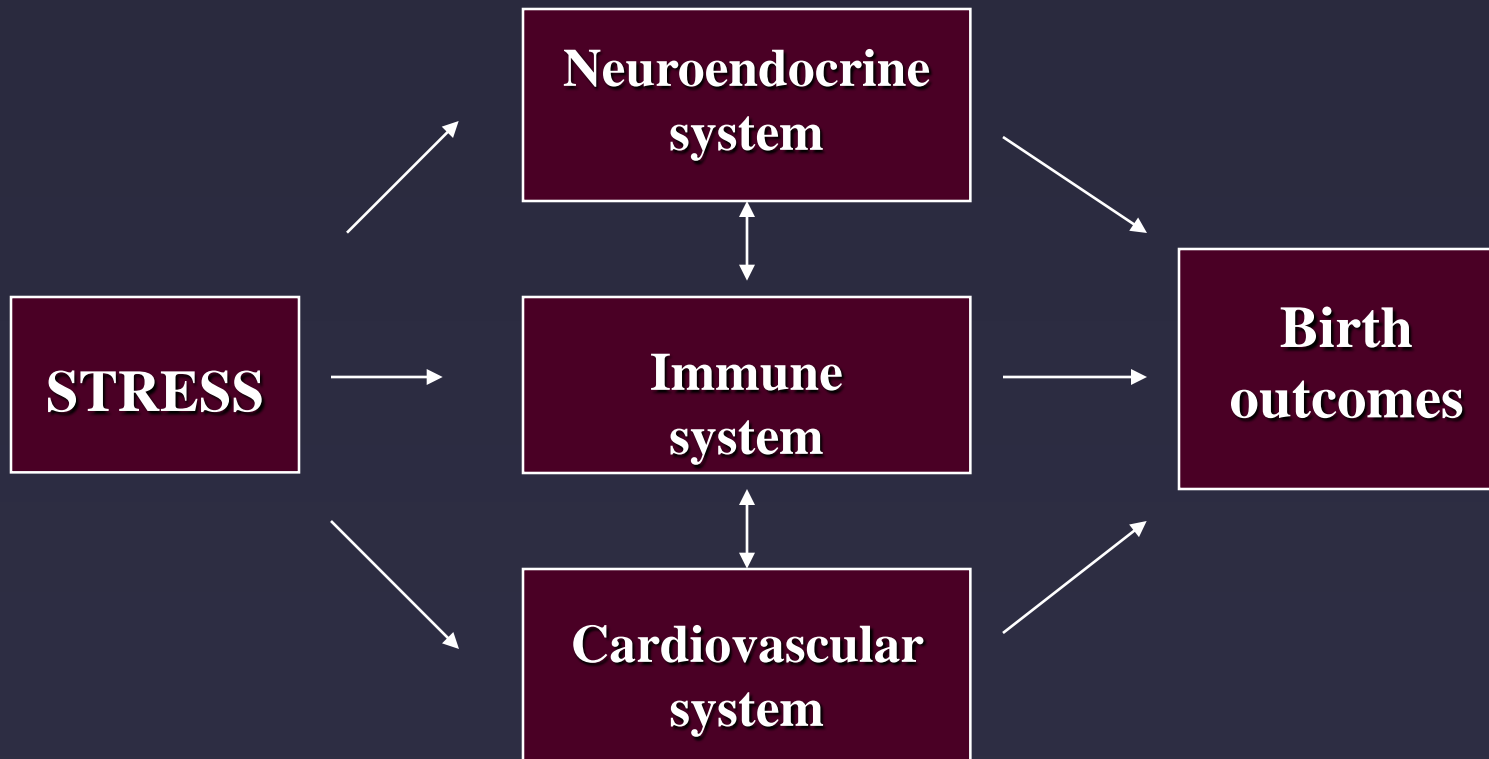
**Gestational length**



*African-Americans face greater and more severe stressors earlier in life, encounter them more frequently, and perceive these events as more stressful than do other groups*

*Askenasy, Dohrenwend, & Dohrenwend, 1977; Dohrenwend, 1973; Feldman, Dunkel-Schetter, Woo & Hobel, 1997; Myers, 1982; Zambrana et al., 1999*

# A Biopsychosocial Model



# Neuroendocrine System

# THE HPA AXIS

- ✓ **Placental CRH controls placental clock**
- ✓ **Maternal stress → maternal CRH, ACTH, cortisol released**
- ✓ **Triggers additional CRH expression in placenta**

*Elevated levels of CRH significantly related to...*

- **PRETERM LABOR** (Korebritis et al, 1998; Wadhwa et al, 1998)
- **PRETERM DELIVERY** (Hobel et al, 1999; McLean et al, 1995; Wadhwa et al, 2004)
- **FETAL GROWTH RESTRICTION** (Wadhwa et al, 2004)

*independent of medical risk*

# Immune System

# INFECTION

- ✓ **Paternal antigens → immunosuppression**
- ✓ **Stress → immunosuppression**
- ✓ **Infection major risk factor for PTD**
  - ✓ **BV most common; AfrAms highest prevalence**
  - ✓ **Proinflammatory cytokines promote placental CRH expression**

*High maternal stress significantly associated with...*

- **DEPRESSED LYMPHOCYTE ACTIVITY**  
(Herrera et al, 1998)
- **BACTERIAL VAGINOSIS** (Culhane et al, 2001)

*independent of confounders*



# Cardiovascular System

# **HYPERTENSIVE DISORDERS**

- ✓ **Stress → cardiovascular disorders**
- ✓ **Preg-induced hypertension and preeclampsia**
  - ✓ **Major risk factors for PTD**
  - ✓ **Significantly elevated CRH levels (Jeske et al, 1990; Perkins et al, 1995; Warren et al, 1995)**

- **Elevated CRH related to abnormal UTEROPLACENTAL BLOOD FLOW** (Giles et al, 1996)
- **DBP REACTIVITY to stressor task predicted gestational length and infant birthweight** (McCubbin et al, 1996)
- **Maternal anxiety associated with PULSATILITY INDEX** (Sjostrom et al, 1997; Teixeira et al, 1999)

# Negative Self-Society Dialectic

The health of minority groups is intimately connected to the ***HIGH STRESS STATES*** created by a social system that condones, reinforces, and perpetuates racial discrimination.

*Myers, 1982*

# RACISM LINKED TO

*Decreased life satisfaction*

*Psychological distress      Depression*

*Lower self-esteem      High blood pressure*

*Stroke      Cardiovascular disease*

***INFANT MORTALITY***

***PRETERM DELIVERY***

***LOW BIRTHWEIGHT***

*Few groups, if any, have experienced for so long the kind and degree of discrimination that US-born Blacks have faced.*

*- Singh & Yu, 1996*

# RACISM

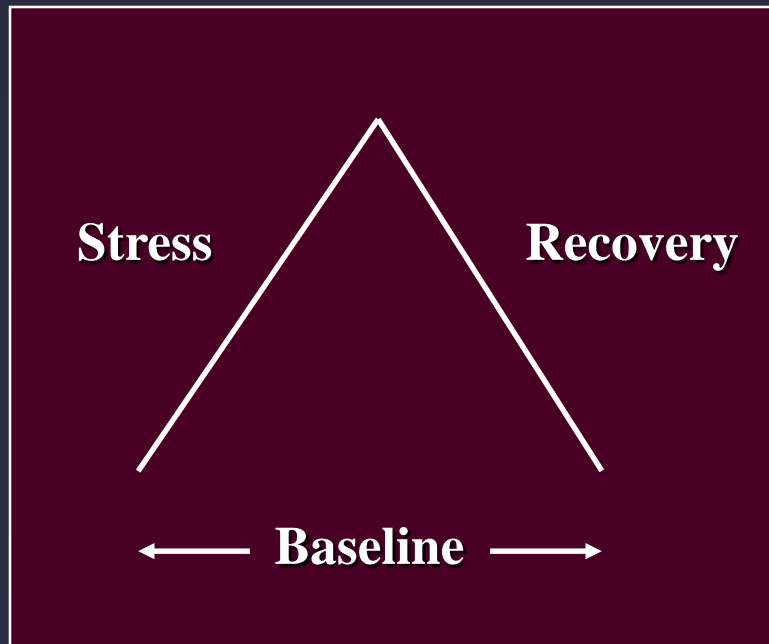
*... a likely fundamental cause of the nations's enduring racial/ethnic disparities in health*

*- James, 2003*

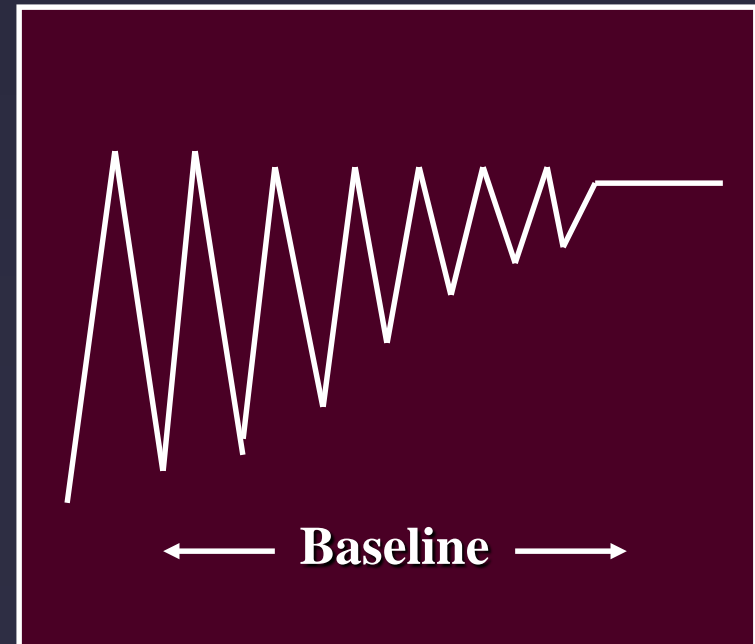
# ALLOSTATIC LOAD

Physiologic toll of repeated and/or chronic stress system activation

## Allostasis



## Allostatic Load





# Physiological Impact of Inequality

- **Weathering** (Geronimus, 1992)
  - as African-American women aged, their risk of delivering a low birthweight infant significantly increased
  - Socioeconomic status moderated the effect
  - Relationship not evident in White women
  - accelerated decline in health status in response to the cumulative effects of social inequality

# Physiological Impact of Racism

- **AfrAms show heightened & prolonged cardiovascular reactivity to racist stimuli** (Armstead et al, 1989; Guyll et al, 2001)
- **Hypertension = cardiovascular dysregulation caused by hyperreactivity to stress** (Manuck, Kasprowicz, & Muldoon, 1990)
- **AfrAms highest rates of general hypertension, hypertensive disorders in pregnancy**

# Physiological Impact of Racism

- **AfrAms report PTSD-like symptoms** (Thompson, 1996)
  - **PTSD associated w/ HPA axis dysregulation**
    - **Evident in AfrAm adolescent girls and pregnant women**

# A MULTIETHNIC COMPARISON

*Are there ethnic differences in perceived lifetime exposure to racism events?*

*Are there ethnic differences in the impact of racism on psychosocial functioning?*

*Are there ethnic differences in the impact of racism on birth outcomes?*

# MS-BIPS DESIGN

- ✓ **Prospective, repeated measures survey**
- ✓ **Psychosocial, medical, physiological variables**
- ✓ **480 Ethnically/socioeconomically diverse pregnant women**
- ✓ **Recruited in clinics or referred by private MDs**
- ✓ **Fluent English**
- ✓  **$\geq 18$  yrs,  $\leq 18$  wks gestation, non-smokers**

# **SAMPLE** consisted of

***70 Latinas***

***177 Nonhispanic Whites***

***25 Asian/Pacific Islanders***

***51 African-Americans***

**with racism data**

# SOCIODEMOGRAPHICS

<i>Variable</i>	<i>AfrAm</i>	<i>API</i>	<i>Latina</i>	<i>White</i>	<i>p-value</i>
<b>Income</b>	<b>2.3(1.7)</b>	<b>3.6(1.8)</b>	<b>2.0(1.4)</b>	<b>4.0(1.6)</b>	<b>0.000</b>
<b>College</b>	<b>19.6%</b>	<b>60.0%</b>	<b>17.1%</b>	<b>66.1%</b>	<b>0.000</b>
<b>Work</b>	<b>45.1%</b>	<b>60.0%</b>	<b>70.0%</b>	<b>77.0%</b>	<b>0.000</b>
<b>Cohab</b>	<b>66.7%</b>	<b>100.0%</b>	<b>88.6%</b>	<b>94.8%</b>	<b>0.000</b>
<b>US born</b>	<b>100.0%</b>	<b>48.0%</b>	<b>75.7%</b>	<b>93.1%</b>	<b>0.000</b>

**Are there ethnic differences  
in perceived lifetime exposure  
to racism?**



# INTERPERSONAL RACISM

*Have you ever felt that you (or someone close) were discriminated against or the target of prejudice b/c of race in interpersonal, housing, employment, educational, other situations?*

# RACISM EXPERIENCES

## *LIFETIME*

<i>Variable</i>	<i>AfrAm</i>	<i>API</i>	<i>Latina</i>	<i>White</i>	<i>p-value</i>
<b>DSCR_C</b>	<b>3.2(3.2)</b>	<b>3.1(2.4)</b>	<b>1.4(1.9)</b>	<b>1.0(1.7)</b>	<b>0.000</b>
<b>DSCR_D</b>	<b>72.5%</b>	<b>88.0%</b>	<b>54.3%</b>	<b>40.7%</b>	<b>0.000</b>

*Unadj: APIs & AFRams / Latinas & Whites*

*Adj: Latinas / Whites*

# RACISM EXPERIENCES

## PERSONAL

<i>Variable</i>	<i>AfrAm</i>	<i>API</i>	<i>Latina</i>	<i>White</i>	<i>p-value</i>
<b>PERS_C</b>	<b>1.5(1.7)</b>	<b>1.6(1.6)</b>	<b>0.7(0.9)</b>	<b>0.5(0.9)</b>	<b>0.000</b>
<b>PERS_D</b>	<b>58.7%</b>	<b>72.0%</b>	<b>44.3%</b>	<b>27.4%</b>	<b>0.000</b>

*Unadj: APIs & AFRams / Latinas & Whites*

*Adj: Latinas / Whites*

# RACISM EXPERIENCES

## *VICARIOUS*

<i>Variable</i>	<i>AfrAm</i>	<i>API</i>	<i>Latina</i>	<i>White</i>	<i>p-value</i>
<b>VIC_C</b>	<b>1.9(2.0)</b>	<b>1.5(2.0)</b>	<b>0.8(1.3)</b>	<b>0.5(1.1)</b>	<b>0.000</b>
<b>VIC_D</b>	<b>63.0%</b>	<b>60.0%</b>	<b>37.1%</b>	<b>29.9%</b>	<b>0.000</b>

*Unadj: APIs & AFrAms / Latinas & Whites*

*Adj: Latinas / Whites*

# RACISM EXPERIENCES

## AS A CHILD

<i>Variable</i>	<i>AfrAm</i>	<i>API</i>	<i>Latina</i>	<i>White</i>	<i>p-value</i>
<b>Child_C</b>	<b>1.5(1.8)</b>	<b>1.8(1.9)</b>	<b>0.9(1.4)</b>	<b>0.5(1.0)</b>	<b>0.000</b>
<b>Child_D</b>	<b>51.1%</b>	<b>80.0%</b>	<b>40.0%</b>	<b>25.6%</b>	<b>0.000</b>

*Unadj: APIs & AfrAms / Latinas & Whites*

*Adj: AfrAms do not differ from Latinas*

# RACISM EXPERIENCES

## AS AN ADULT

<i>Variable</i>	<i>AfrAm</i>	<i>API</i>	<i>Latina</i>	<i>White</i>	<i>p-value</i>
<b>Adult_C</b>	<b>2.0(2.2)</b>	<b>1.3(1.8)</b>	<b>0.6(0.9)</b>	<b>0.5(1.0)</b>	<b>0.000</b>
<b>Adult_D</b>	<b>63.0%</b>	<b>60.0%</b>	<b>37.1%</b>	<b>29.9%</b>	<b>0.000</b>

*Unadj: APIs &AFrAms / Latinas & Whites*

*Adj: Latinas / Whites*

# **DISTRESS**

**AfrAms and Latinas  
were significantly less  
distressed than APIs  
and Whites**

# RESPONSE

- AfrAms significantly more likely to keep racism experiences to themselves
- AfrAms significantly more likely to accept unfair treatment as a fact of life



**Are there ethnic differences  
in the impact of racism on  
psychosocial functioning  
in pregnancy?**

# PSYCHOSOCIAL FUNCTIONING

*Stressful Life Events*

*Perceived Stress (PSS)*

*State Anxiety (STAI)*

*Pregnancy-related Anxiety*

*Depression (CES-D)*

*Personal Resources*

# ETHNIC DIFFERENCES

## Unadjusted

AfrAms & Latinas higher ***PSS*** than Whites

AfrAms higher ***CES-D*** than Whites

Latinas marginally higher ***PregAnx*** than Whites

## Adjusted

Whites lower ***PregAnx*** than Latinas and APIs

# Associations with Racism

<i>Variable</i>	<i>r</i>	<i>b</i>
<b>PSS</b>	<b>0.27**</b>	<b>0.23**</b>
<b>STAI</b>	<b>0.30**</b>	<b>0.30**</b>
<b>Preg Anx</b>	<b>0.24**</b>	<b>0.22**</b>
<b>CES-D</b>	<b>0.18**</b>	<b>0.15*</b>
<b>Resources</b>	<b>-0.14*</b>	<b>-0.14*</b>

\*  $p < 0.05$ , \*\*  $p < 0.01$

# **INTERACTIONS**

**No evidence that racism's  
impact on psychosocial  
functioning was moderated  
by race.**

**Are there ethnic differences  
in the impact of racism on  
birth outcomes?**

# BIRTHWEIGHT DIFFERENCES

<i>White</i>	<b>3484.40 (554.63)</b>
<i>Latina</i>	<b>3447.33 (600.21)</b>
<i>API</i>	<b>3226.88 (715.70)</b>
<i>AfrAm</i>	<b>3216.86 (508.72)</b>

*Unadj: Whites / AfrAms*

*Adj: Whites / AfrAms & APIs*

# Gestational Age Differences

<i>White</i>	<b>39.15 (1.60)</b>
<i>Latina</i>	<b>38.76 (2.00)</b>
<i>API</i>	<b>38.14 (2.77)</b>
<i>AfrAm</i>	<b>38.60 (1.96)</b>

*Unadj: Whites / APIs (marginal)*

*Adj: NS*



# Associations with Racism

<i>Variable</i>	<i>r</i>	<i>b</i>
<b>BW</b>	<b>-0.13*</b>	<b>-0.13*</b>
<b>GA</b>	<b>-0.12*</b>	<b>-0.12*</b>

\* $p < 0.05$

# INTERACTIONS

**No evidence that racism's  
impact on birth outcomes  
was moderated by race.**

# Conclusions

- ✓ **Ethnic differences in racism exposure, distress, and coping**
- ✓ **Racism impacts psychosocial fx and birth outcomes**
- ✓ **Physiological mediators important to elucidate**

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