

*New Insights into Racial and Ethnic
Group Differences in Birth Outcomes*

James W. Collins, Jr.

5/28/08

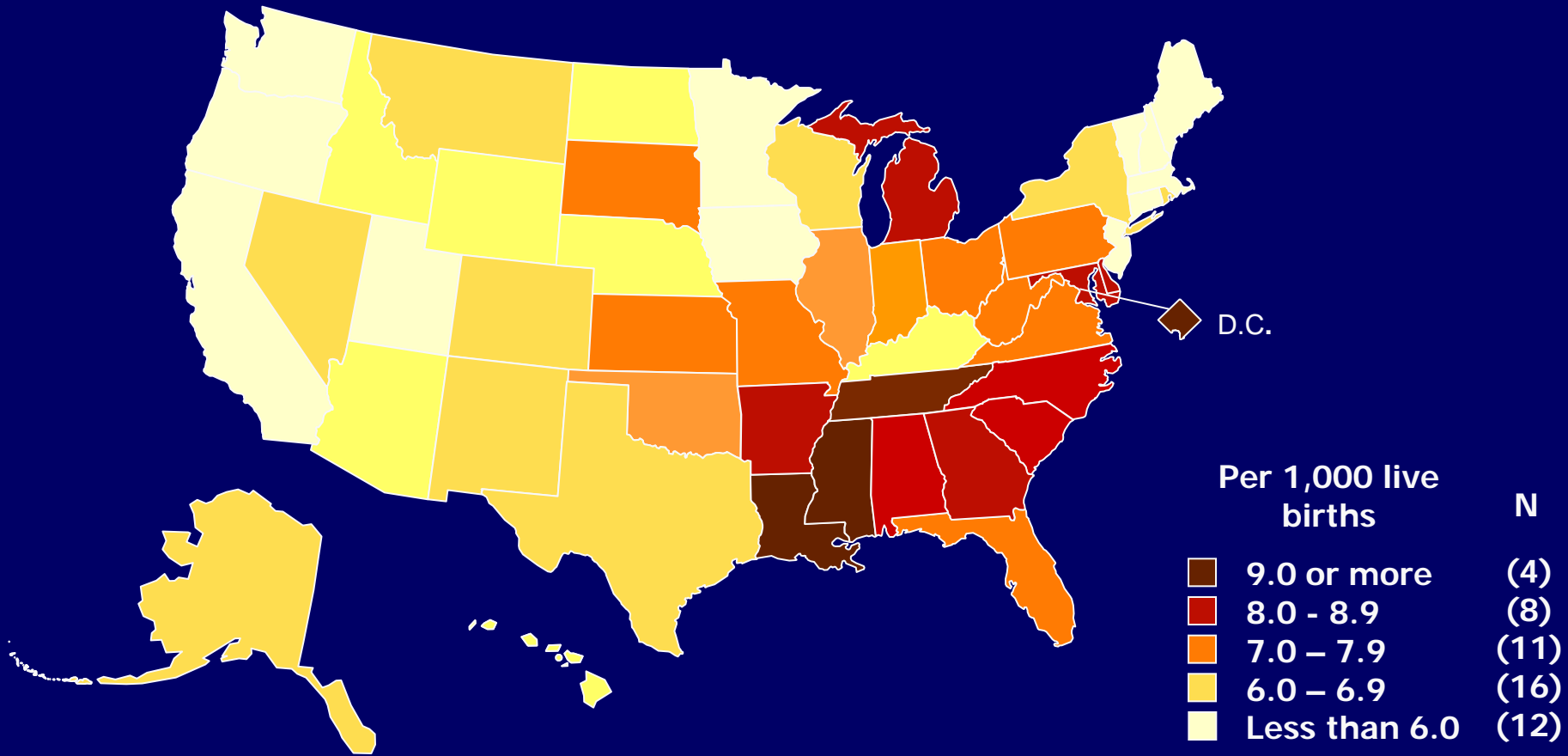
INFANT MORTALITY RATES

1. Singapore	2.7	16. Canada	5.3
2. Hong Kong	2.9	17. Netherlands	5.3
3. Japan	3.0	18. Greece	5.4
4. Sweden	3.2	19. Belgium	5.4
5. Norway	3.8	20. Portugal	5.6
6. Finland	3.8	21. United Kingdom	5.6
7. Czech Republic	4.1	22. Israel	5.8
8. Denmark	4.2	23. Ireland	5.9
9. France	4.4	24. New Zealand	6.1
10. Spain	4.4	25. Cuba	6.2
11. Germany	4.4	26. United States	6.8
12. Italy	4.6		
13. Austria	4.8		
14. Switzerland	4.9		
15. Australia	4.9		

- 19,350 infants a year could be prevented if the IMR in our country was lowered to the level achieved in Japan.
- A sum greater than the total number of deaths among all children aged 1 to 15 years.

Infant Mortality Rate by State, 2002-2004

2010 Target = 4.5



Source: NVSS, NCHS, CDC.

CITIES WITH THE HIGHEST IMR

-- District of Columbia

-- Detroit

-- Atlanta

-- Newark

-- Cleveland

-- Norfolk

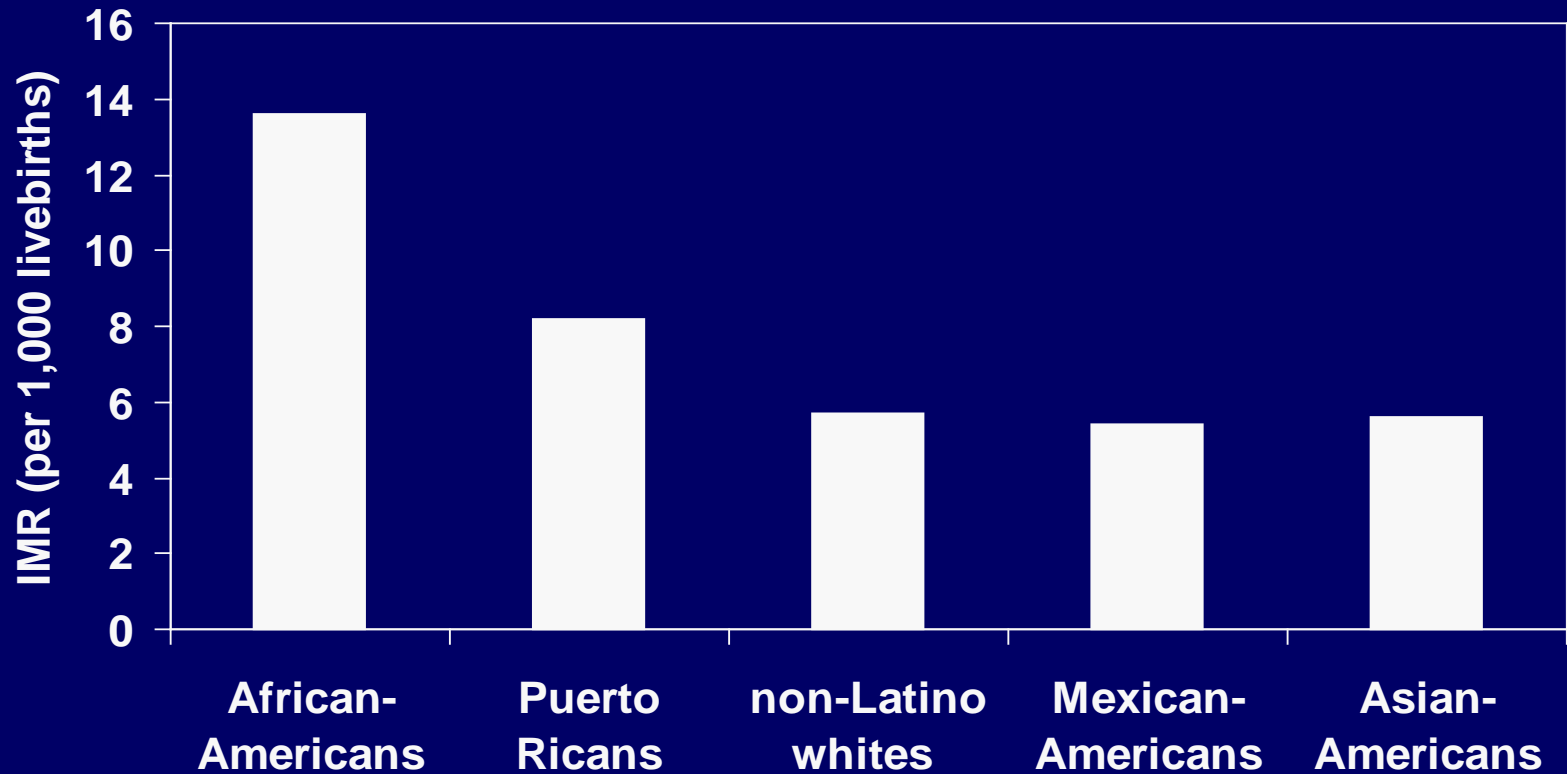
-- Baltimore

-- Chicago

-- Philadelphia

-- Milwaukee

INFANT MORTALITY RATES IN THE U.S. (2003)

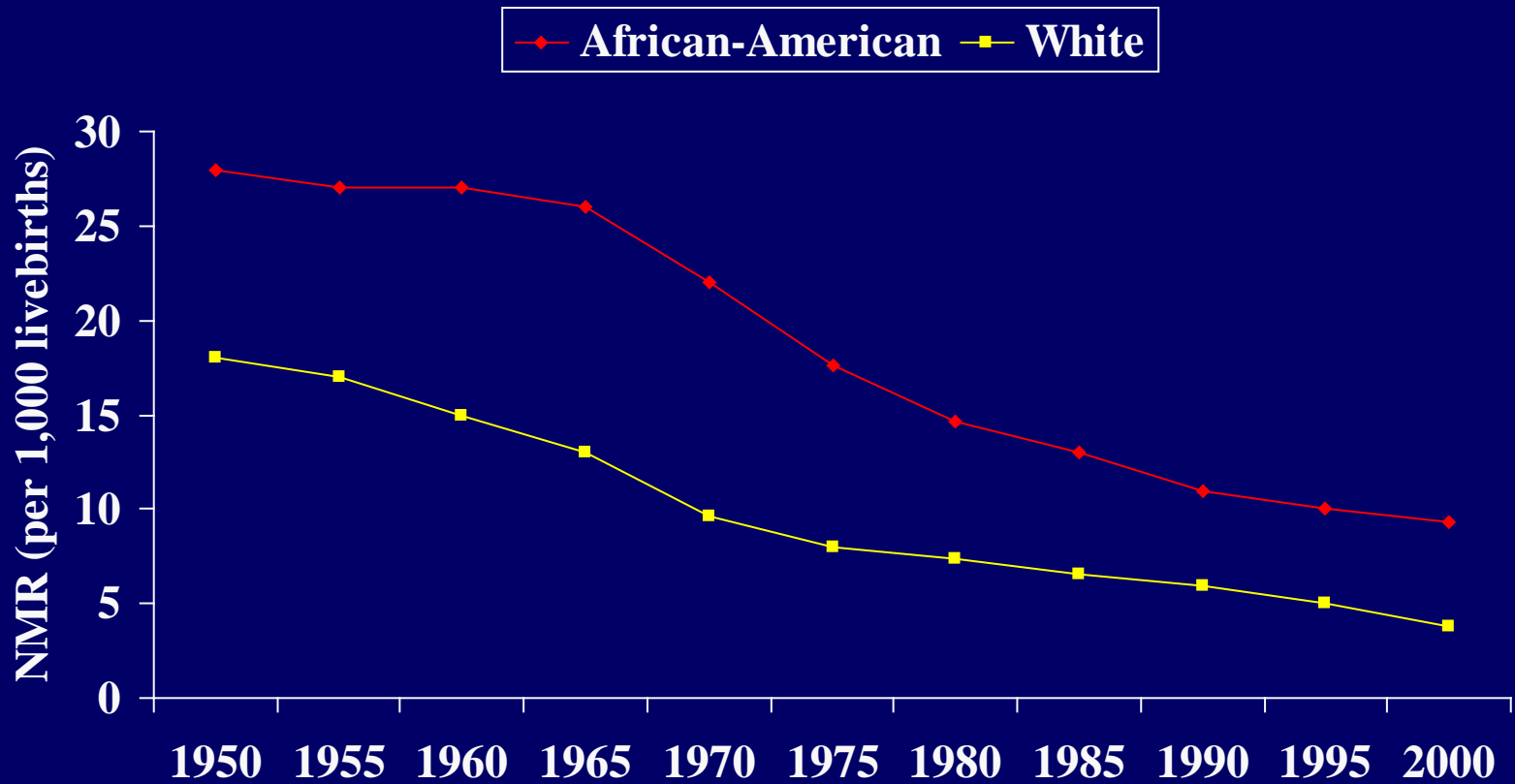


6,000 African-American infant deaths a year could be prevented if the IMR of African-Americans was lowered to the level of whites.

Cause-Specific Infant Death Rates: United States

Causes of Infant Death	White	African-American	RR
Congenital malformations	1.4	1.6	1.2
Disorders related to short gestation	0.8	2.9	3.9
SIDS	0.5	1.2	2.4
Pregnancy complications	0.3	0.8	3.1
Complications of placenta, cord, membranes	0.2	0.4	2.0

NEONATAL MORTALITY RATES



Birth Weight-Specific Mortality

Neonatal Mortality Rate (NMR)

Birth Weight Distribution



- LBW (< 2500g) infants account for 7.9% of births and 66% of deaths.
- VLBW (< 1500g) infants account for 1.5% of births and 50% of deaths.

16% of VLBW infants are moderately or severely handicapped



RATIONING



22 **Costs vs. benefits**

Holding fragile neonatal lives in the balance: Should society spend so much on so few?

The streets
of Chicago:
Images of
loneliness

Searching
for the
Rock-Ols
of ages

BORN TO DIE?

Science is keeping tiny premature infants alive.

Should it?

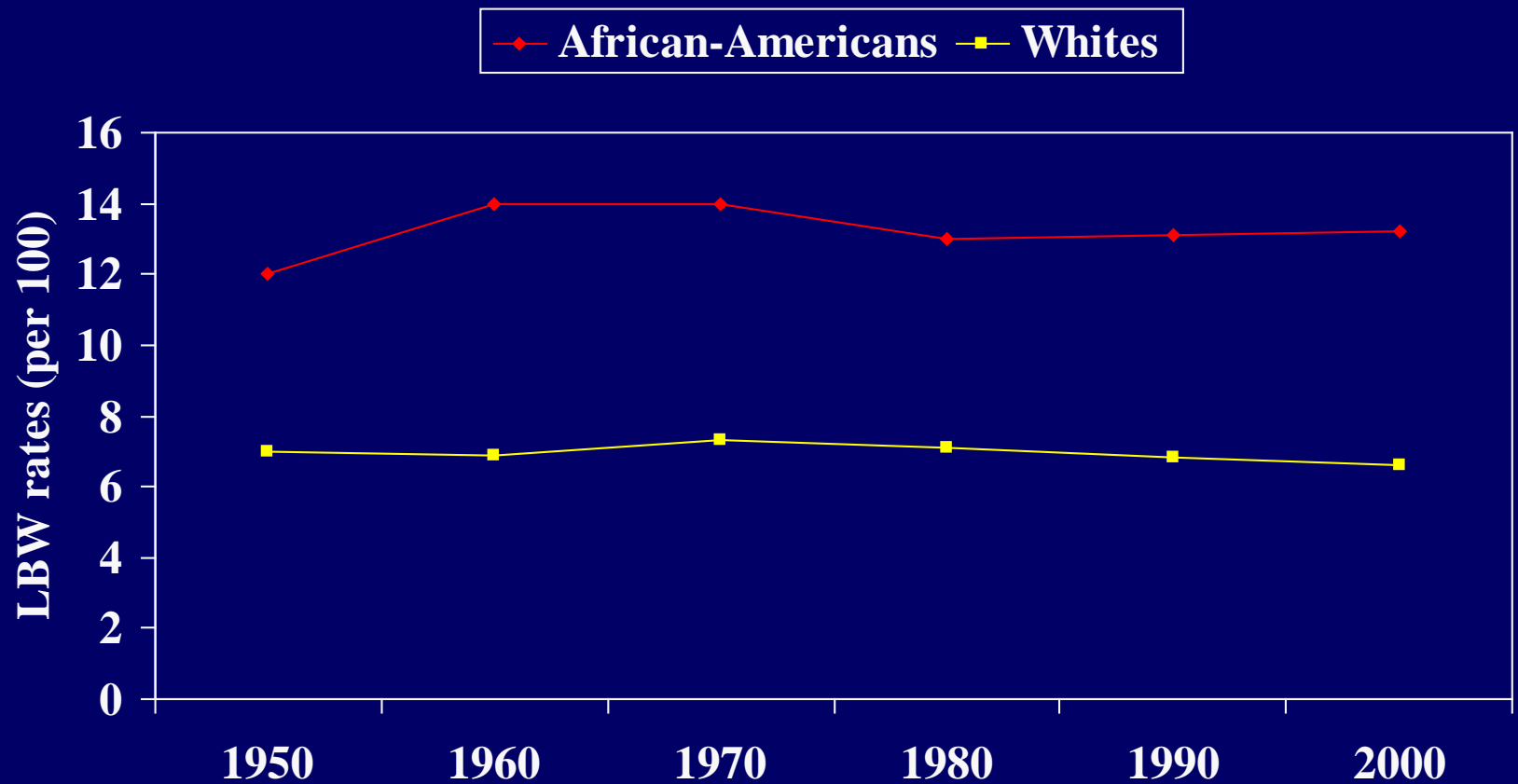
Exploring the frontiers
of medicine and ethics



FETAL ORIGINS OF ADULT DISEASE

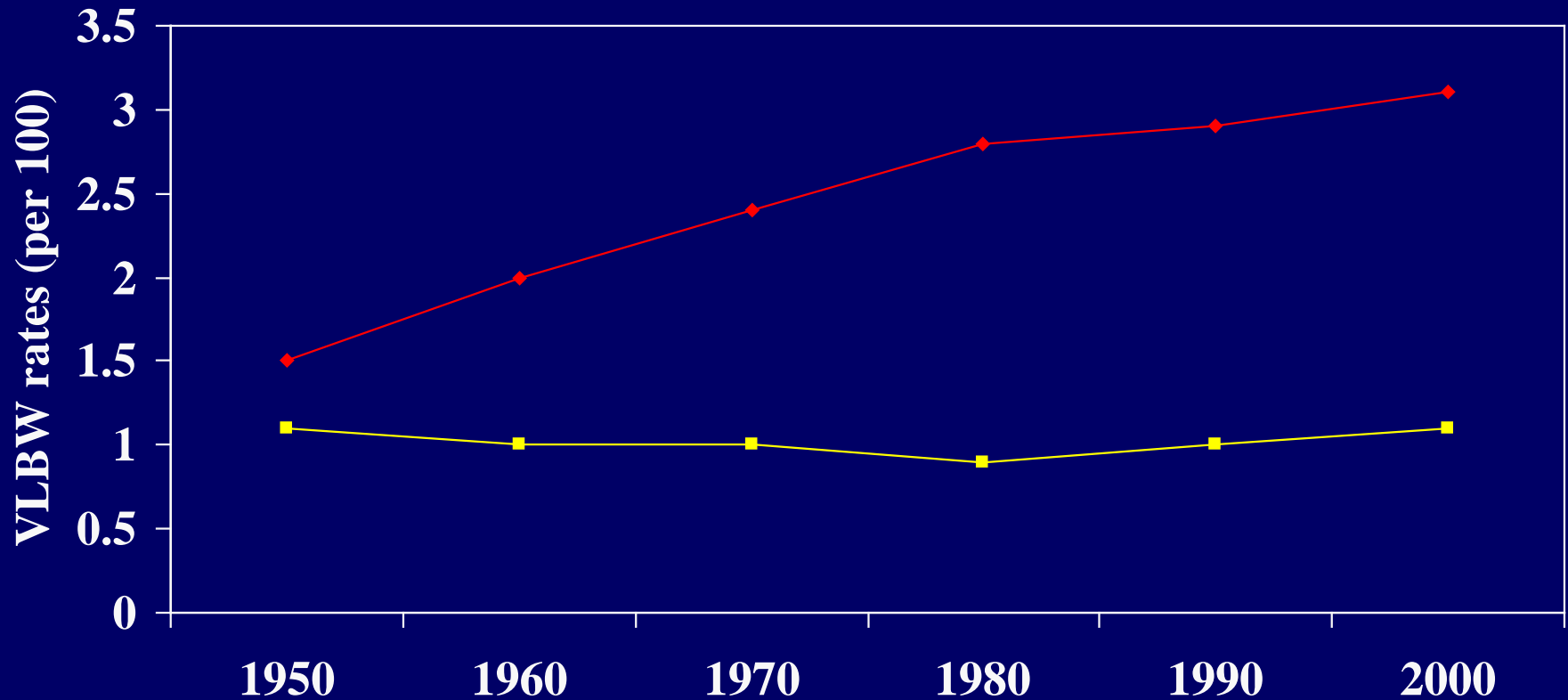
Poor fetal growth and small size at birth are associated with an increased risk of coronary heart disease, stroke, hypertension, Type 2 diabetes, and osteoporosis in adulthood.

Six Decade Trend in Low Birth Weight Rates in the United States



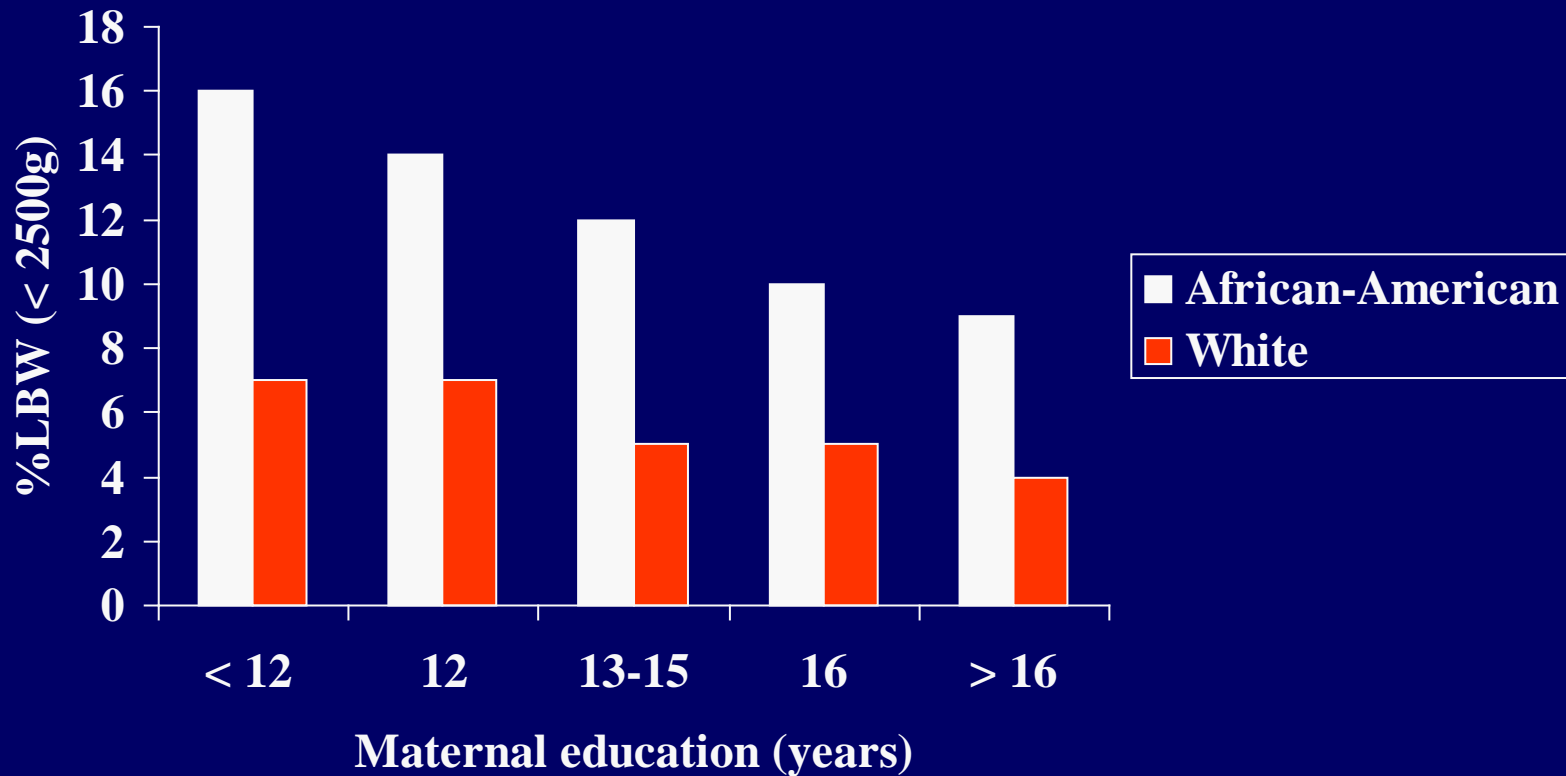
Six Decade Trend in Very Low Birth Weight Rates in the United States

—◆— African-Americans —■— Whites



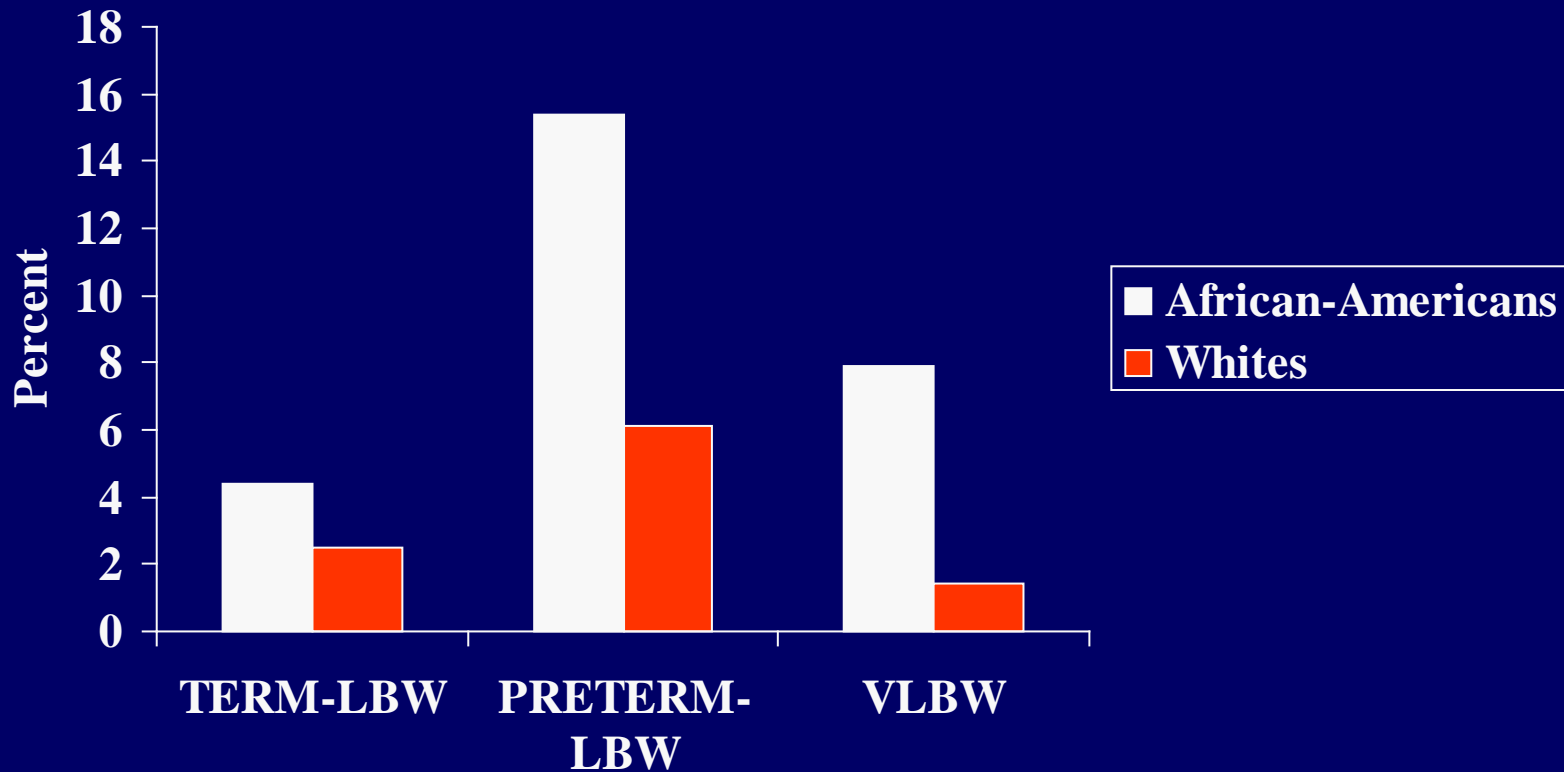
Low Birth Weight Rates by Maternal Education and Race

(Chicago, IL)



RACIAL GAP IN PERINATAL OUTCOME AMONG INFANTS CONCEIVED BY ART

(Schieve et al, Obstet Gynecol, 2004)



Transgenerational Factors

Factors, conditions, and environments experienced by one generation that relate to the pregnancy outcome of the next generation

Chicago Tribune Magazine

MARCH 4, 2001 • SECTION 10



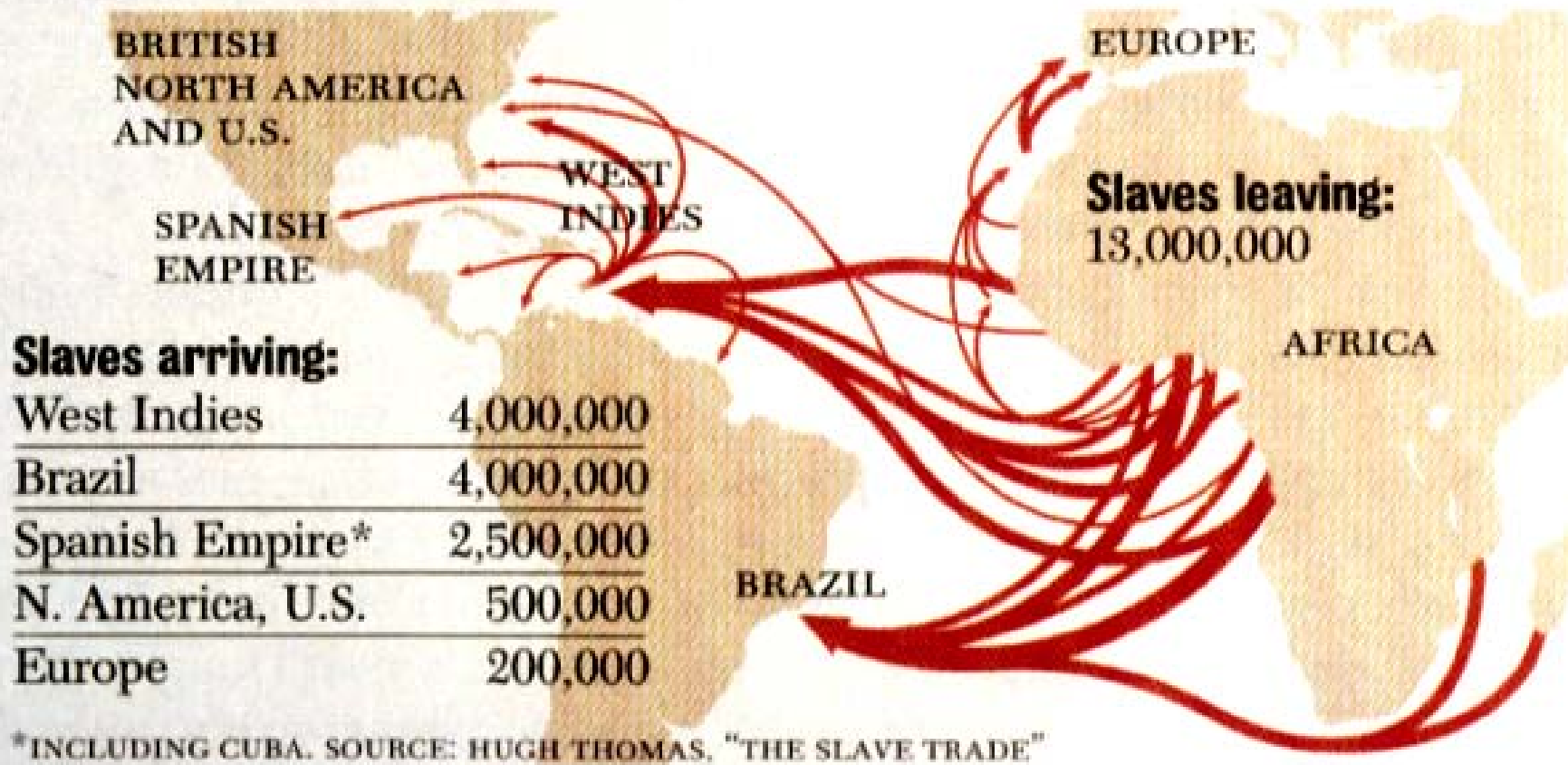
FINDING

AN IMMIGRANT FAMILY'S JOURNEY THROUGH THE GENERATIONS

HOME

In American Bondage

The European slave trade was both lucrative and brutal. Historians estimate that between 10 and 15 percent of the slaves who left Africa died along the route of the “Middle Passage.”





American Slavery: 1619-1865

“The bound labor of at least twelve generations of black people”.

- Slavery created wealth for slaveholders, wealth that was translated into extraordinary political power. The slave trade and the products created by slaves’ labor, particularly cotton, provided the basis for America’s wealth as a nation, underwriting the country’s industrial revolution and enabling it to project its power into the rest of the world.

[Slavery and the Making of America \(PBS\)](#)



AFRICAN AMERICAN CITIZENSHIP STATUS & HEALTH EXPERIENCE FROM 1619 TO 2006

TIME SPAN	CITIZENSHIP STATUS -YRS	Experience accounts for this proportion of time in US	STATUS	HEALTH & HEALTH SYSTEM EXPERIENCE
1619-1865	246 years	64%	Chattel slavery	Disparate/inequitable treatment poor health status & outcomes. "Slave health deficit" & "Slave health sub-system" in effect
1865-1965	100 years	26%	Virtually no citizenship rights	Absent or inferior treatment and facilities. <i>De jure</i> segregation/ discrimination in South, <i>de facto</i> throughout most of health system. "Slave health deficit" uncorrected
1965-2006	41 years	10%	Most citizenship rights: <i>USA struggles to transition from segregation & discrimination to integration of AA</i>	So. med school desegregation 1948. Imhotep Hospital Integration Conf 1957-1964, hospital desegregation in federal courts 1964. Disparate health status, outcomes, and services with apartheid, discrimination, institutional racism and bias in effect.
TOTAL	387 years	100%	"Struggle"	HEALTH DISPARITIES/ INEQUITIES

Special Article

**DIFFERING BIRTH WEIGHT AMONG INFANTS OF U.S.-BORN BLACKS,
AFRICAN-BORN BLACKS, AND U.S.-BORN WHITES**

RICHARD J. DAVID, M.D., AND JAMES W. COLLINS, JR., M.D., M.P.H.

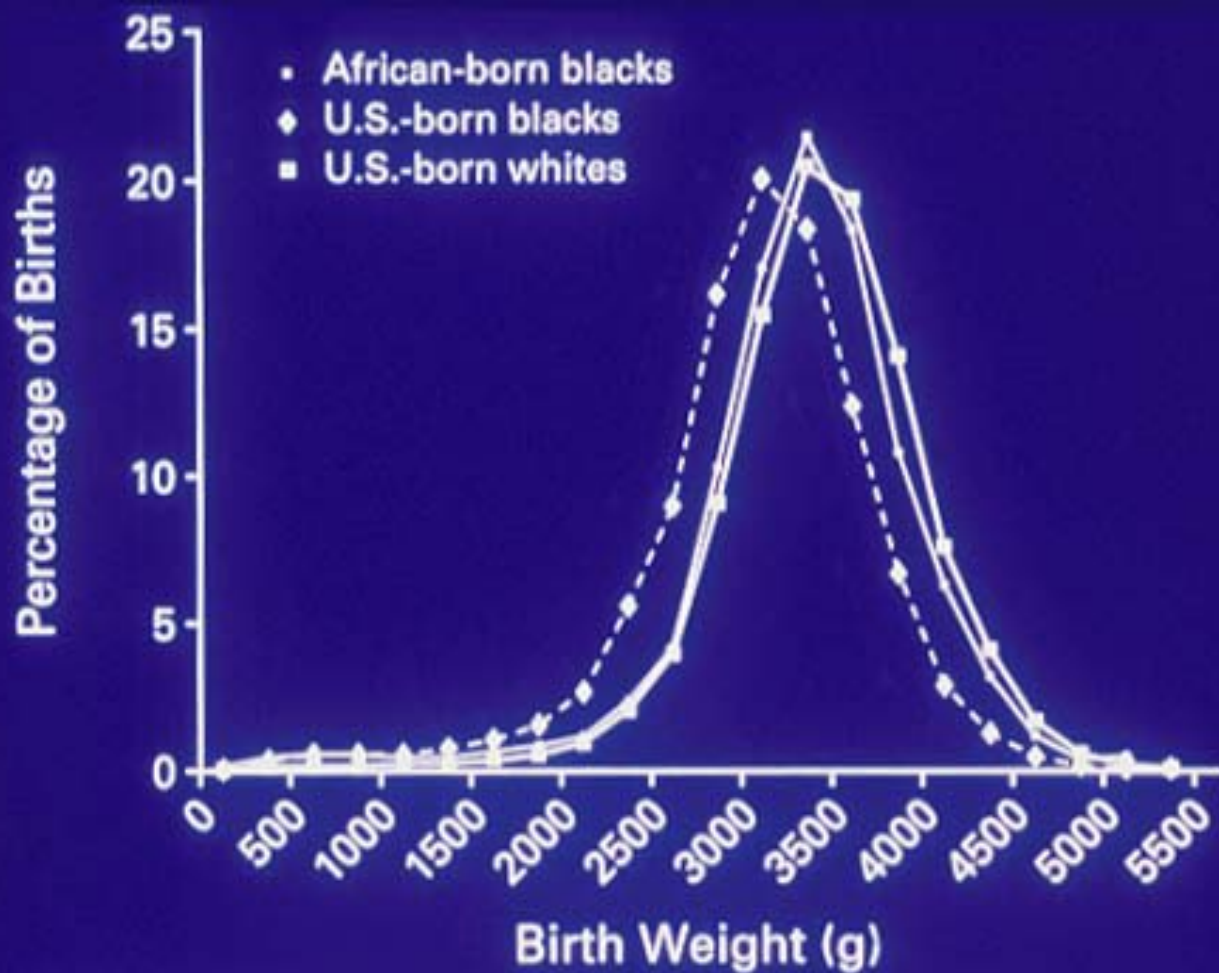
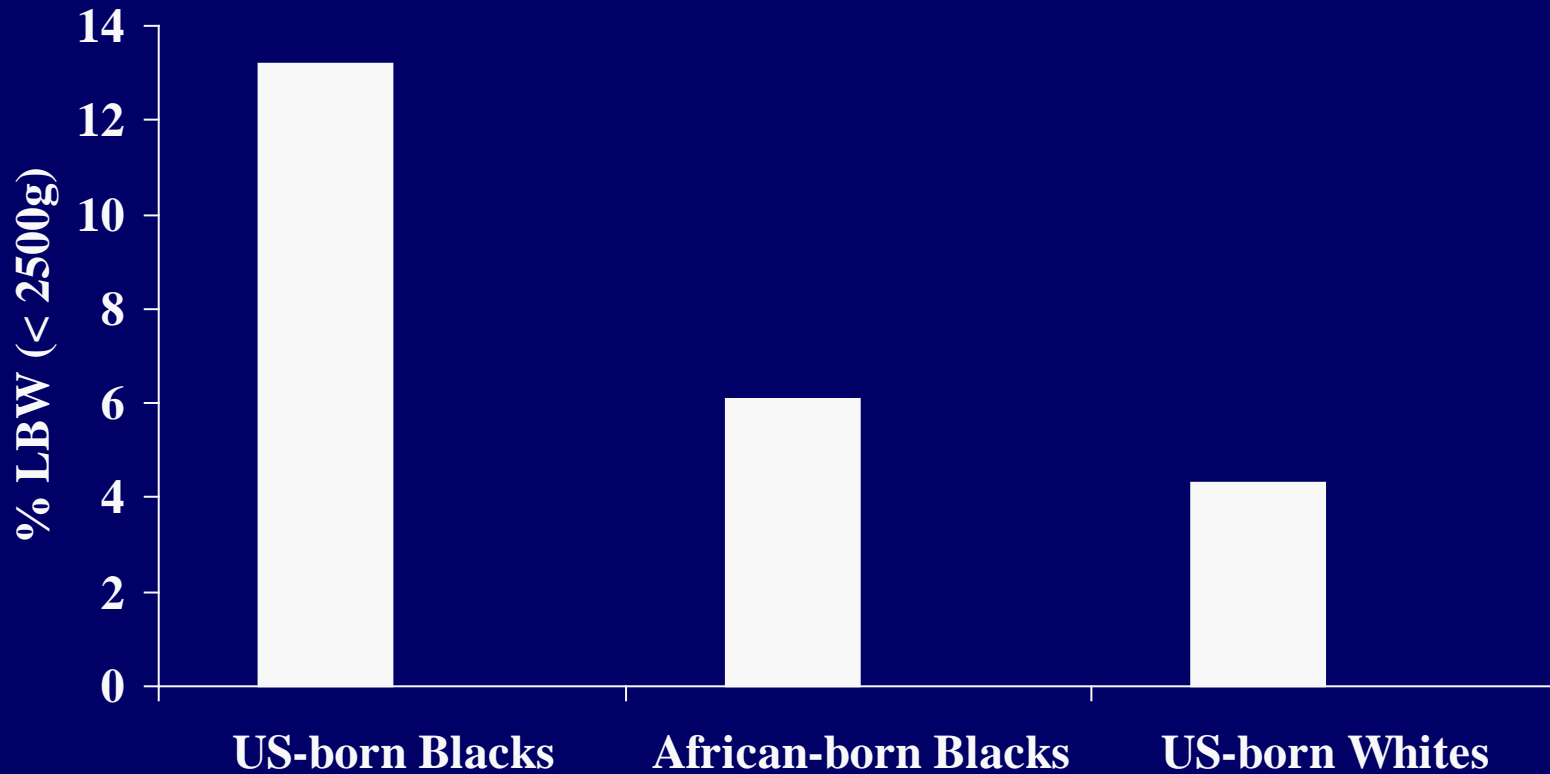
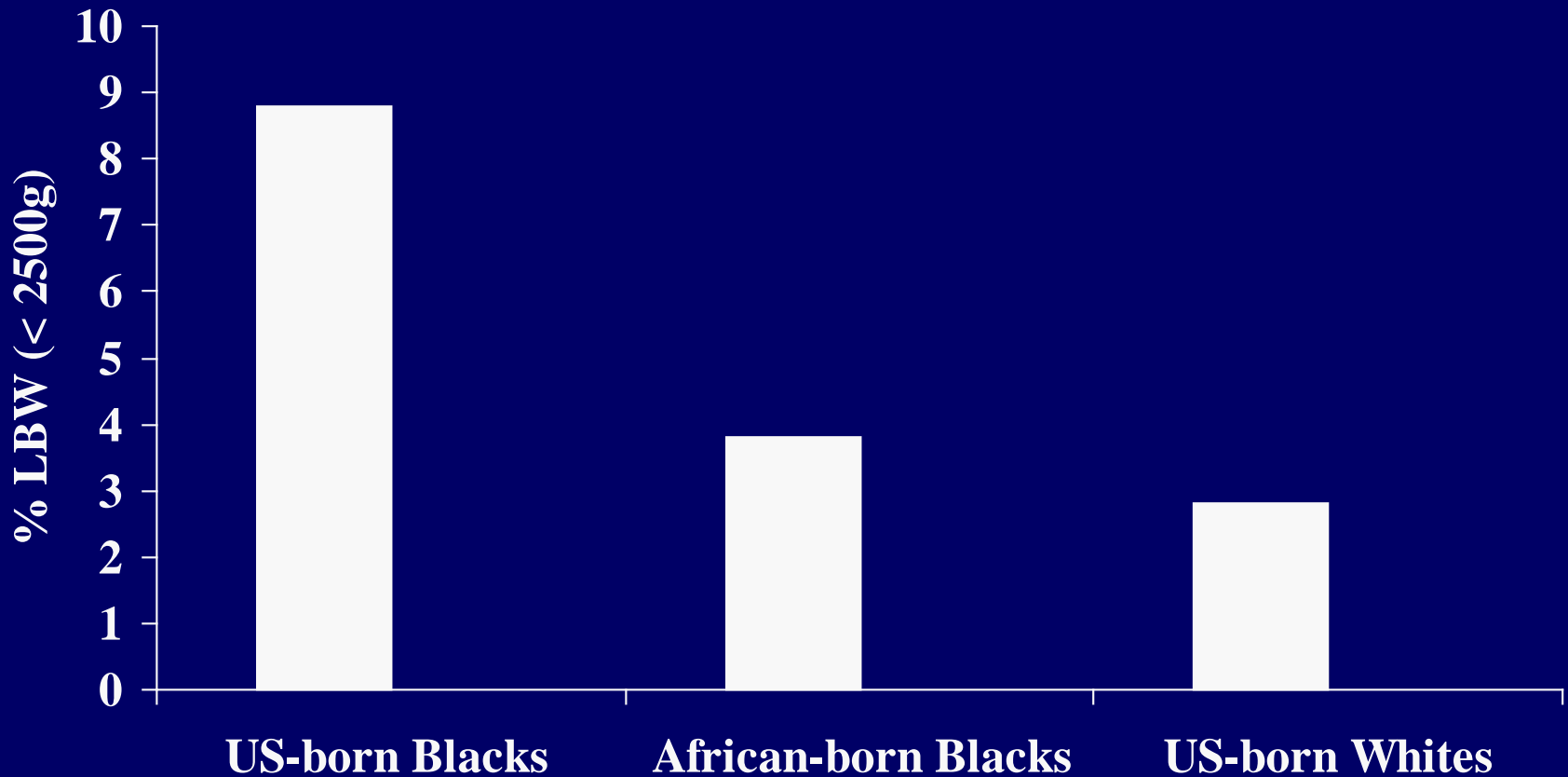


Figure 1. Distribution of Birth Weights among Infants of U.S.-Born White and Black Women and African-Born Black Women in Illinois, 1980–1995.

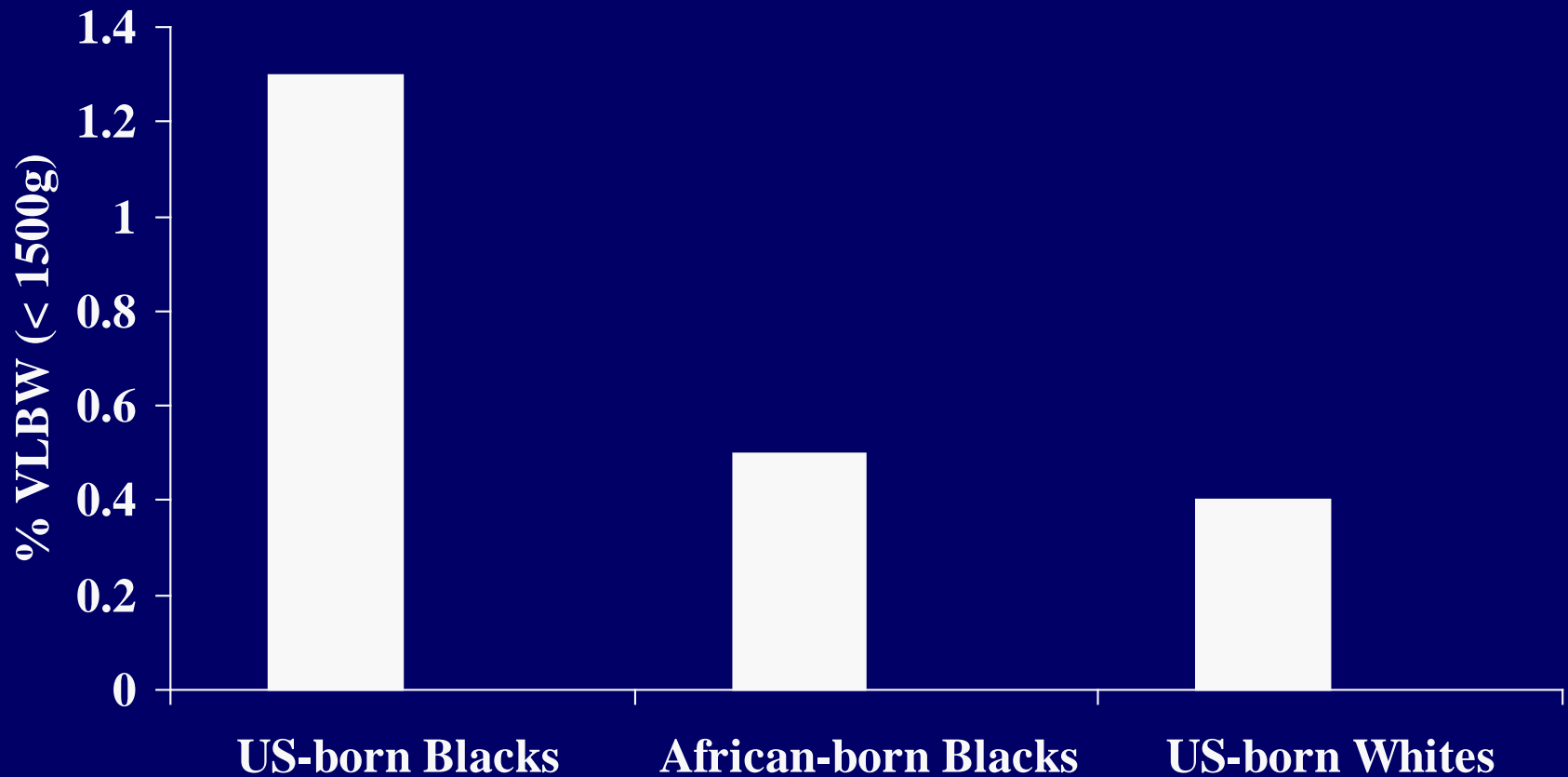
Differing Birth Weight in Illinois *(David and Collins, NEJM, 1997)*



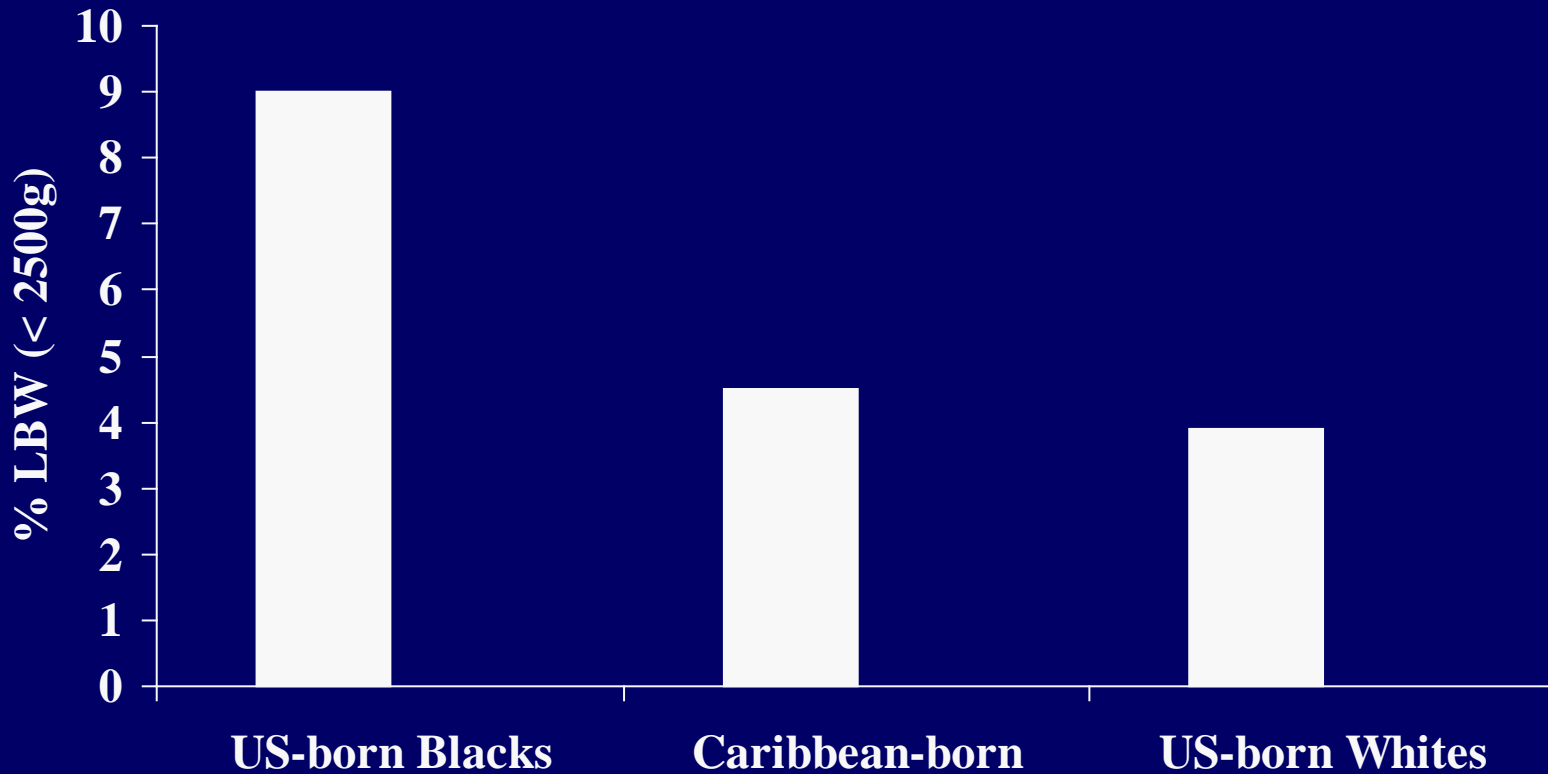
*Differing LBW Rates Among Low-risk
Women in Illinois
(David and Collins, NEJM, 1997)*



Differing VLBW Rates Among Low-risk Women in Illinois
(David and Collins, NEJM, 1997)



*Maternal Race and Infant Birth Weight
Among Low-Risk Women in Illinois
(Pallotto et al, AJE, 2000)*





American Journal of Epidemiology
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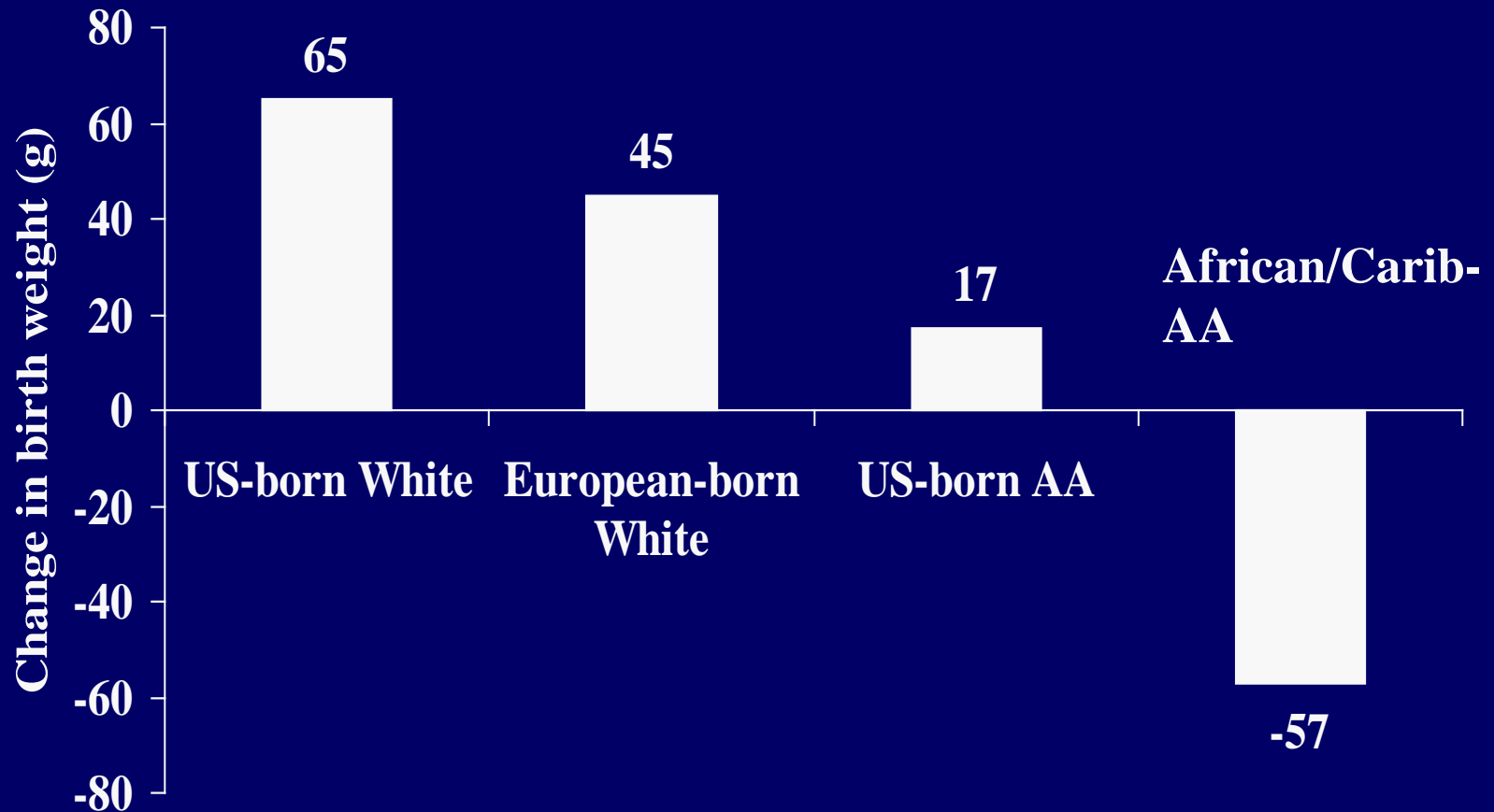
Vol. 155, No. 3
Printed in U.S.A.

Differing Intergenerational Birth Weights among the Descendants of US-born and Foreign-born Whites and African Americans in Illinois

James W. Collins, Jr.,¹ Shou-Yien Wu,² and Richard J. David²

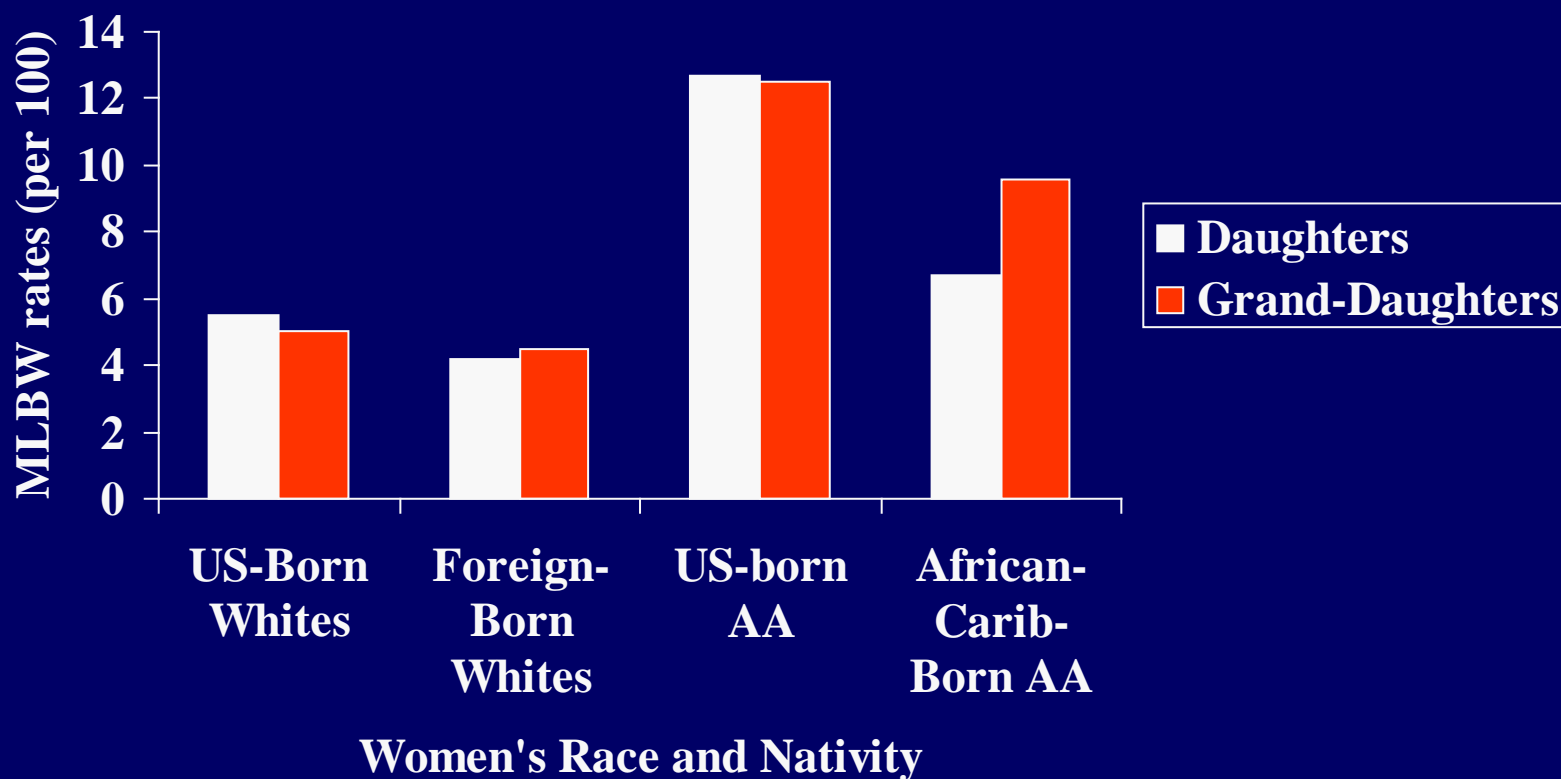
Change in Mean Birth Weight Across a Generation

(Collins et al, AJE, 2002)

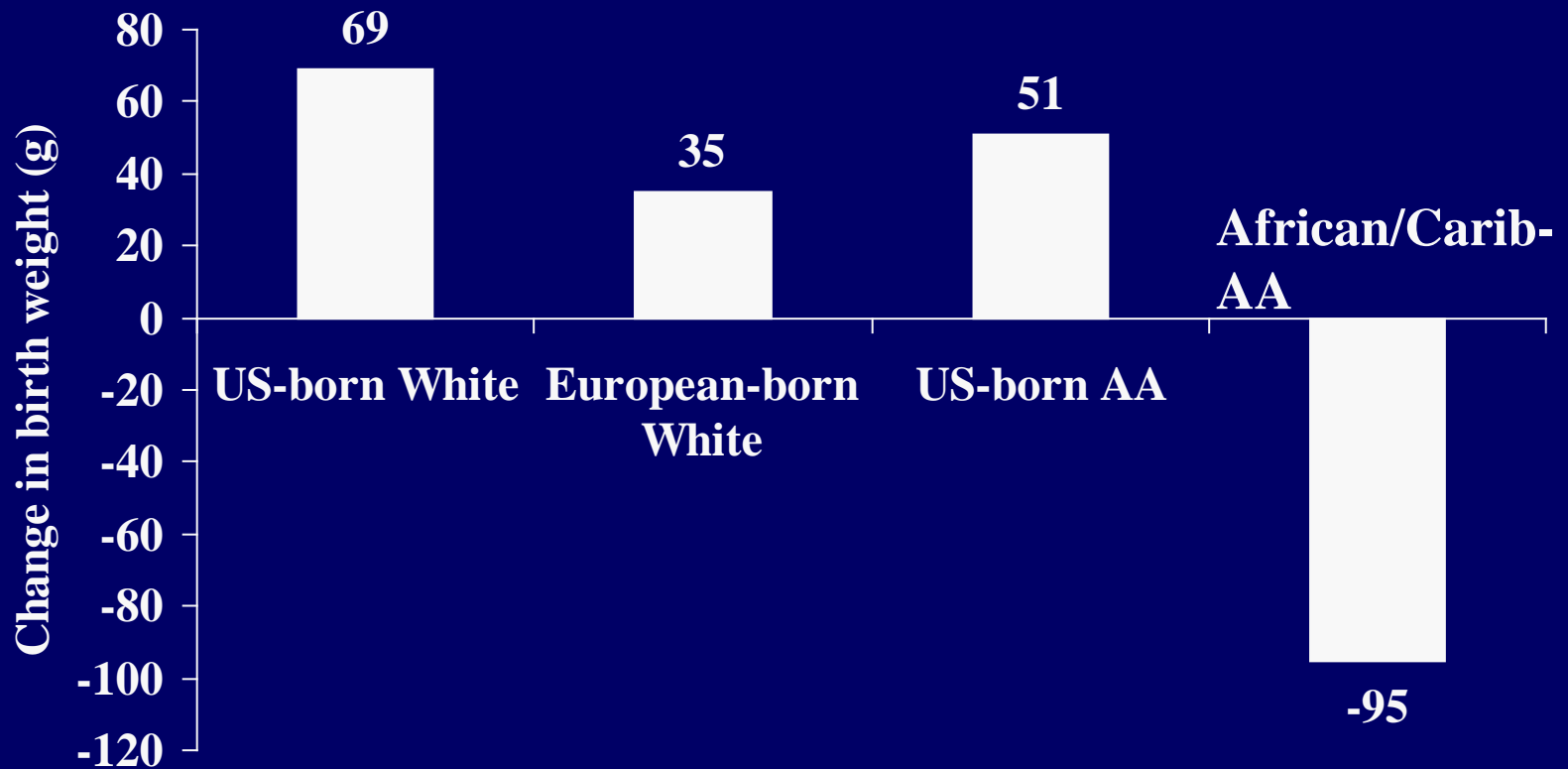


MLBW Rates Across a Generation

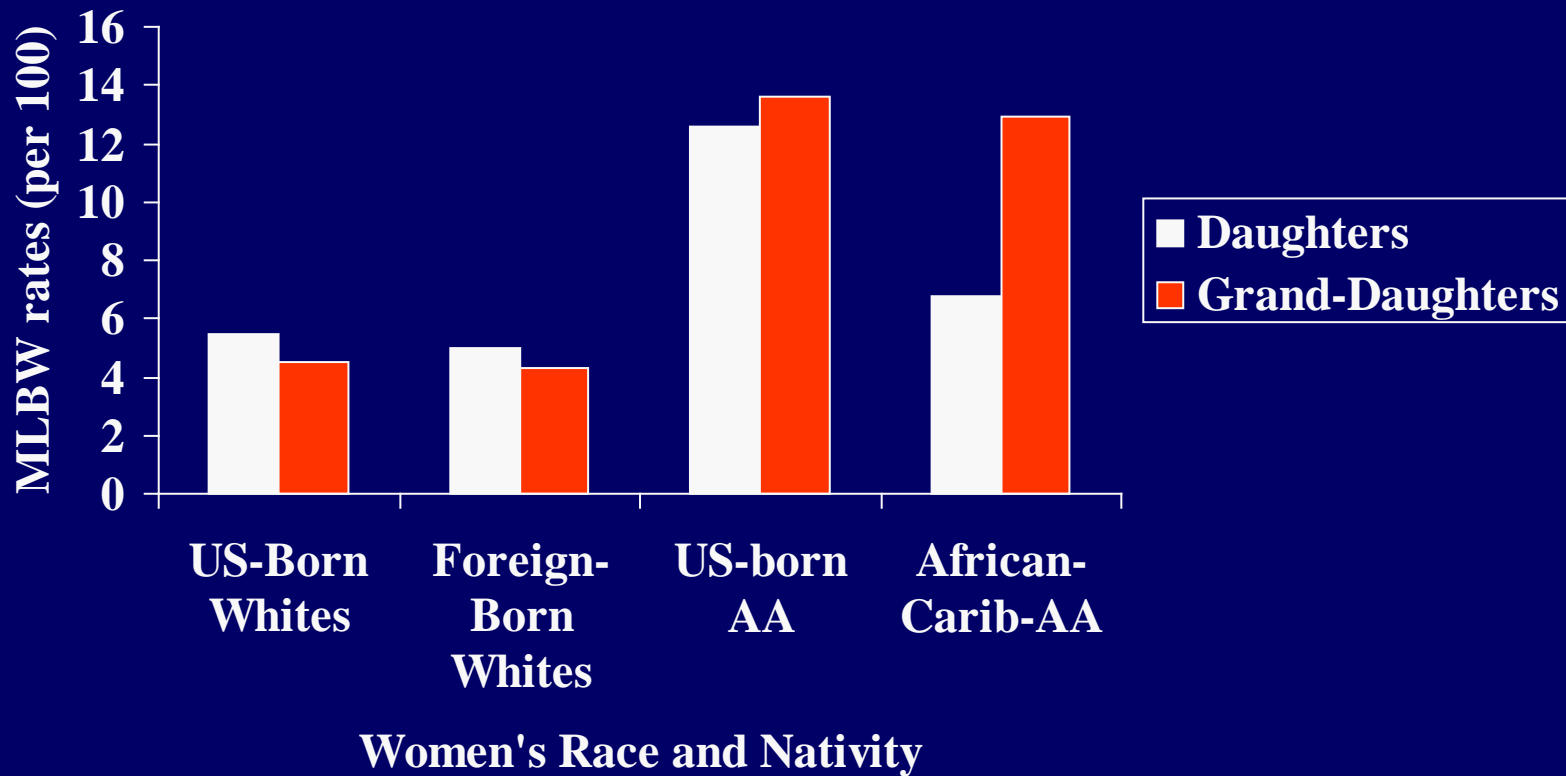
(Collins et al, AJE, 2002)

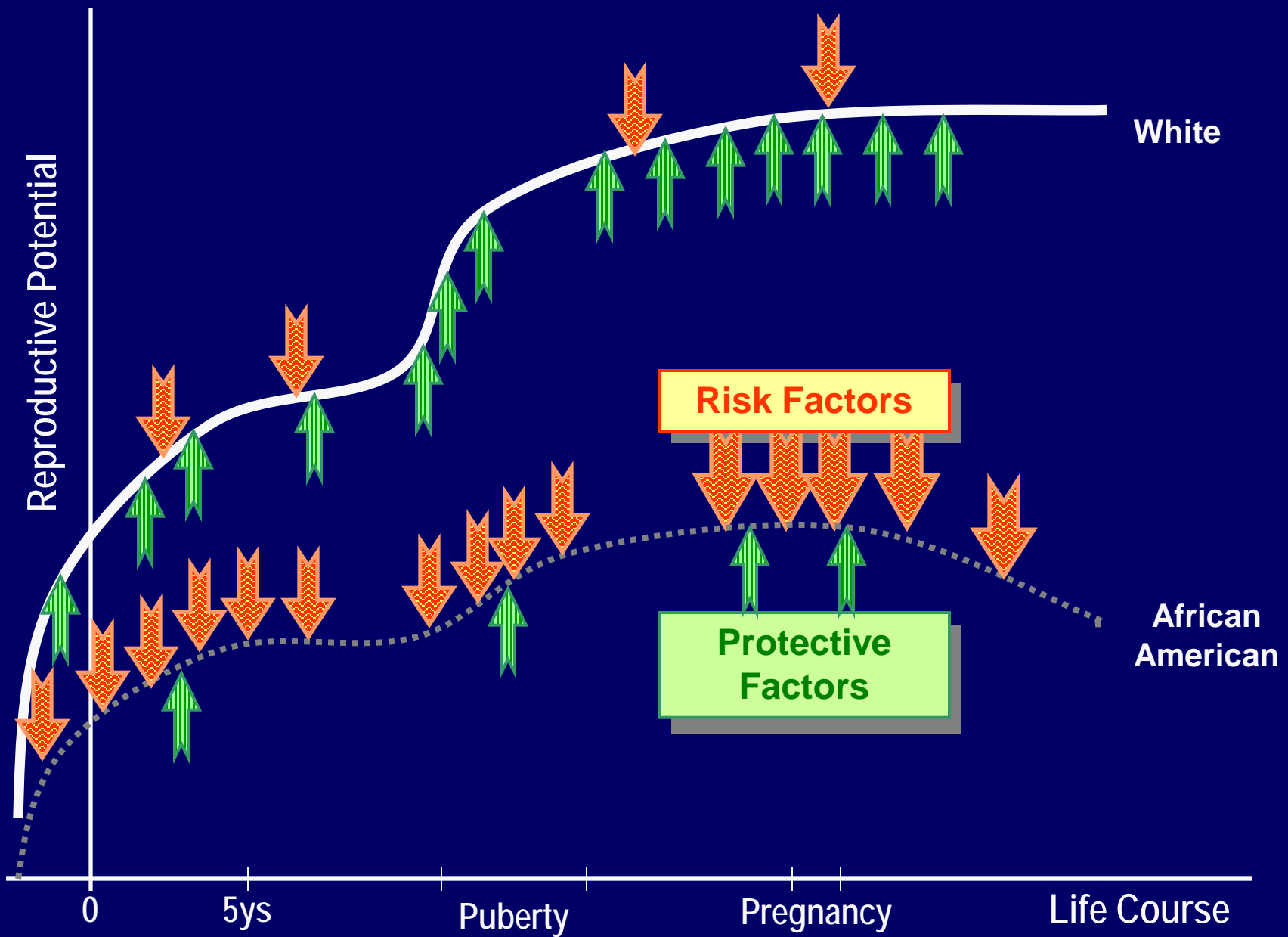


*Change in Mean Birth Weight Among
infants of Married Women Across a
Generation (Collins et al, AJE, 2002)*



MLBW Rates Among Infants of Married Women Across a Generation (Collins et al, AJE, 2002)





The Racial Gap in Reproductive Potential: A Life-Course Perspective *Lu and Halfon, MCHJ, 2003*

Changing Research Focus from Pregnancy to Pre-Pregnancy Factors

- Early-Life Programming Hypothesis:
 - Impaired fetal growth is a risk factor for later poor reproductive outcome.
- Cumulative Pathway Hypothesis:
 - Life-long exposure to chronic stress is a risk factor for poor reproductive outcome.

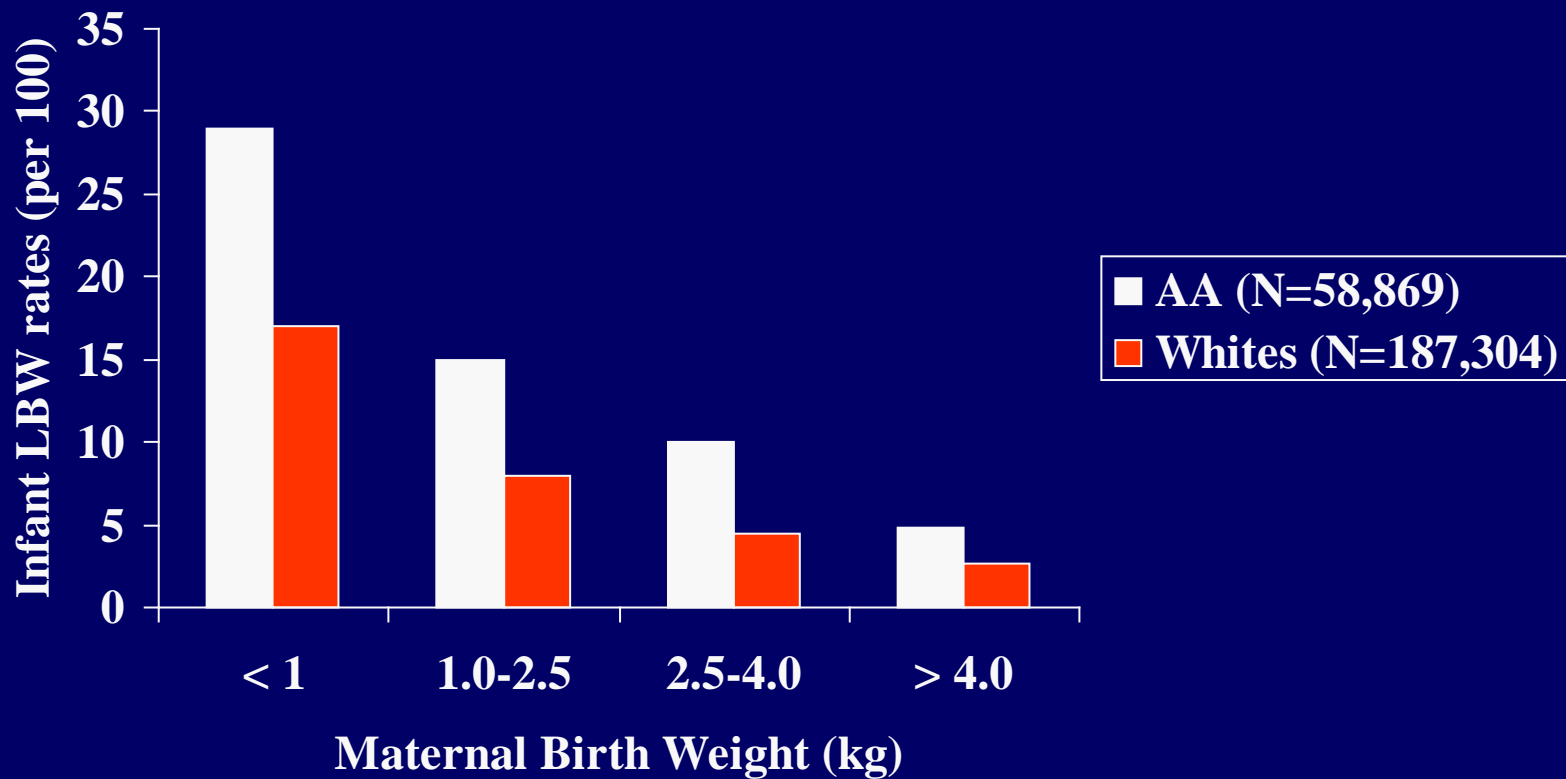


Developmental Origins Model of Female Reproductive Outcome

(Maternal low birth weight is a proxy measure of aberrant fetal reproductive programming and is a risk factor for future poor pregnancy outcome)

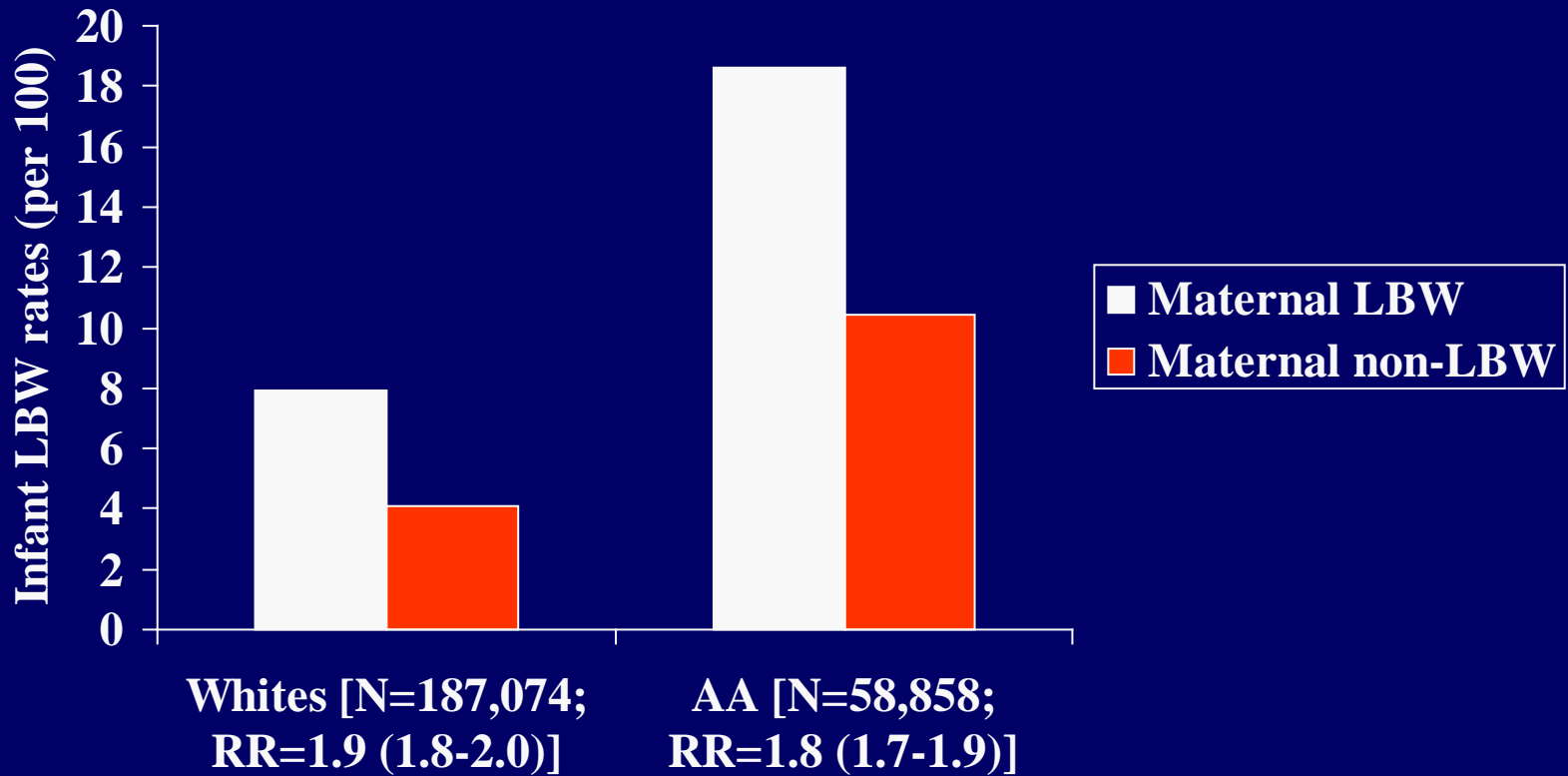
INFANT LBW RATES BY MATERNAL BIRTH WEIGHT AND RACE

(Illinois Transgenerational Dataset)

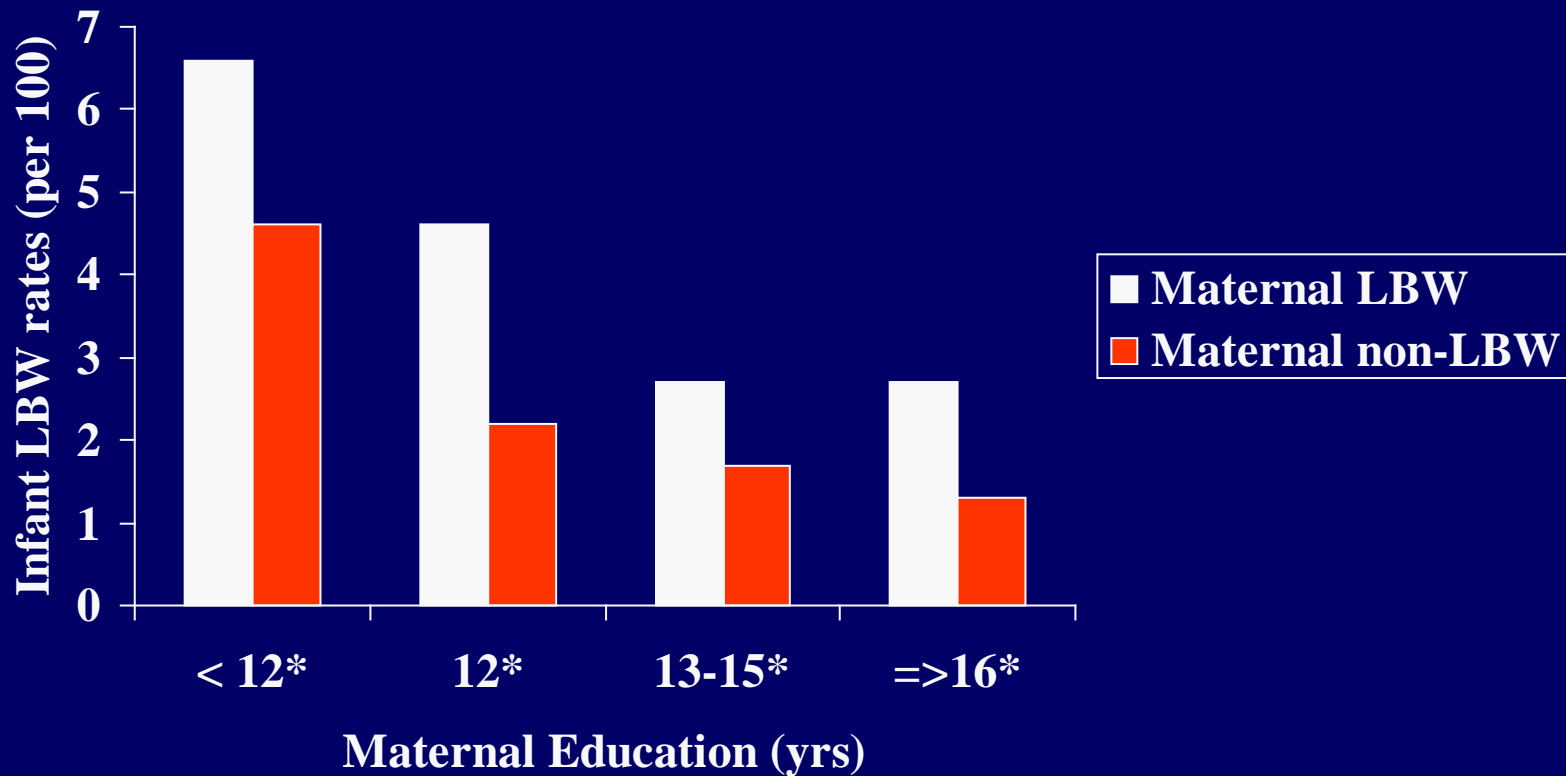


INFANT LBW RATES BY MATERNAL BIRTH WEIGHT AND RACE

(Collins et al, MCHJ,2003)



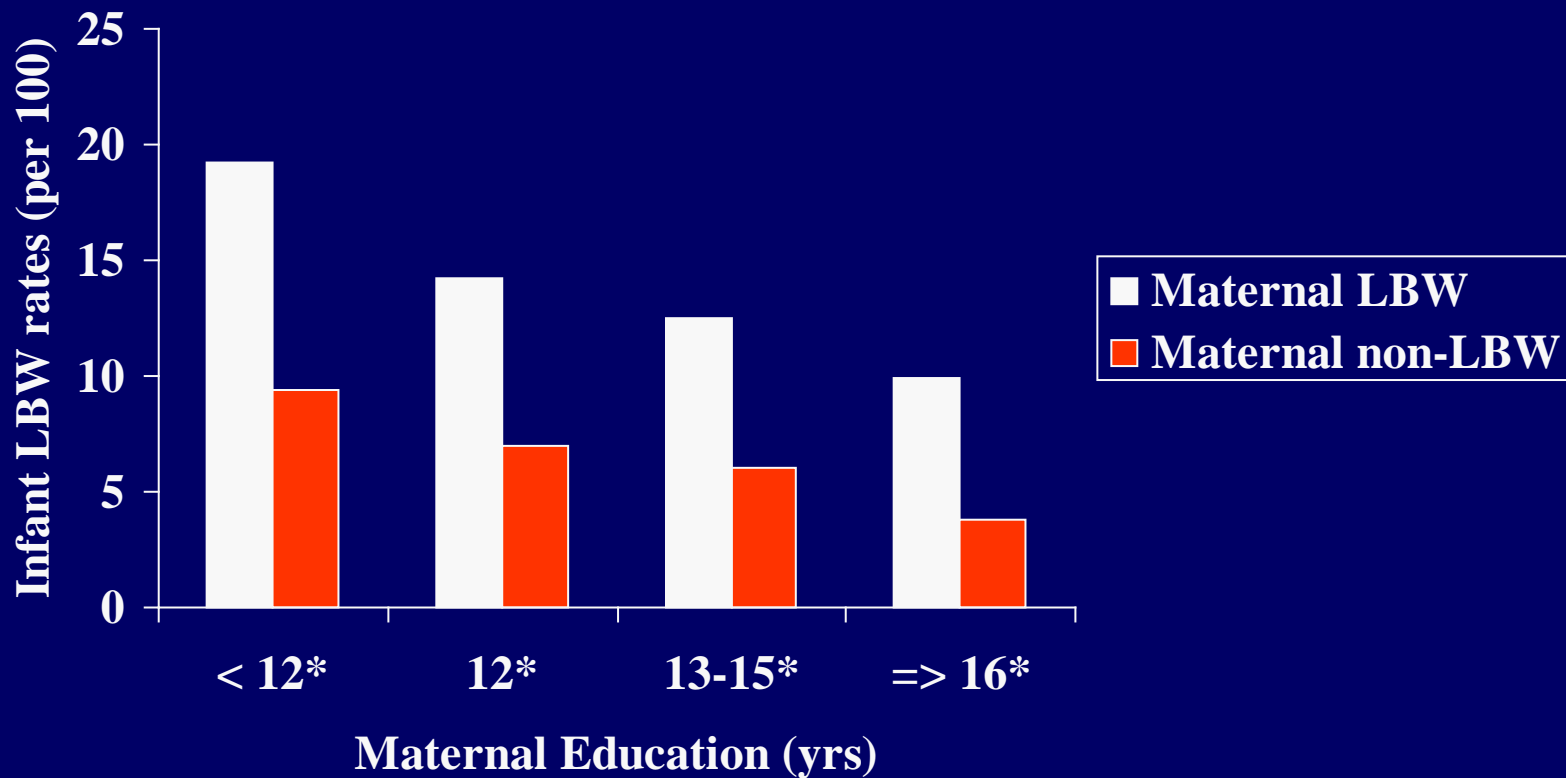
***INFANT LBW RATES BY MATERNAL BIRTH
WEIGHT AND EDUCATION
(WHITES, ADEQUATE PC)
(Collins et al, MCHJ, 2003)***



INFANT LBW RATES BY MATERNAL BIRTH WEIGHT AND EDUCATION

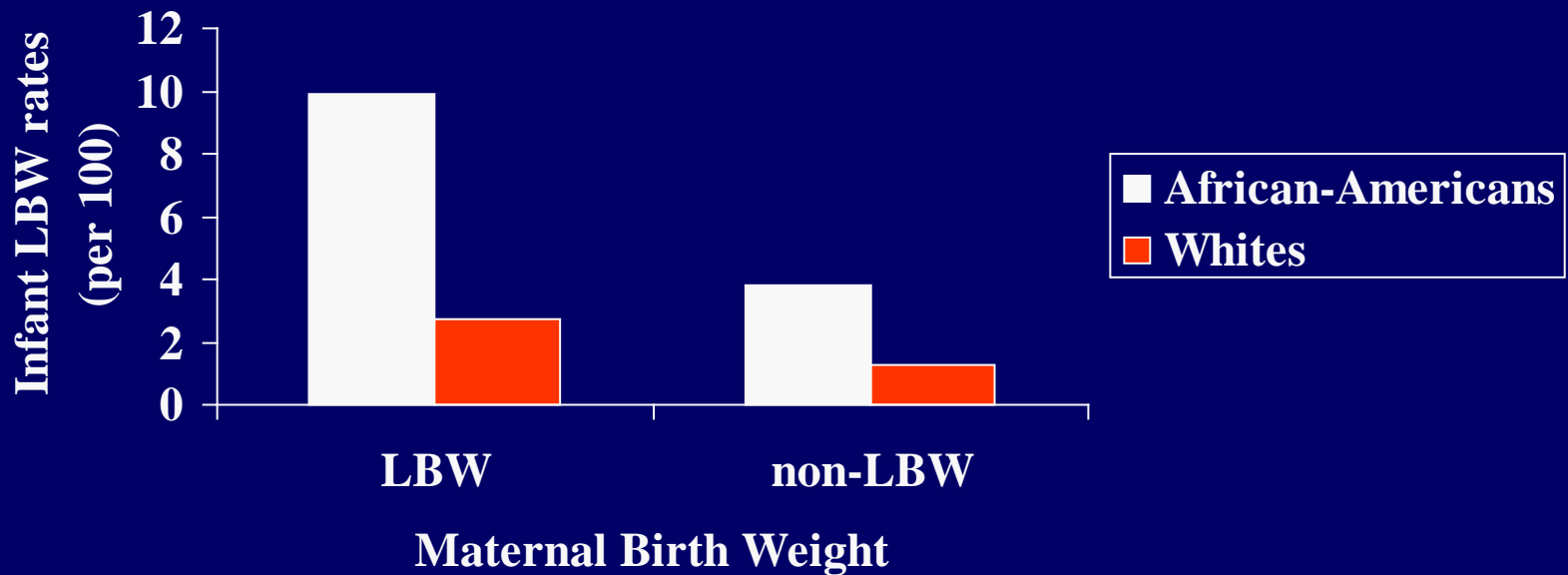
(AA, ADEQUATE PC)

(Collins et al, MCHJ, 2003)

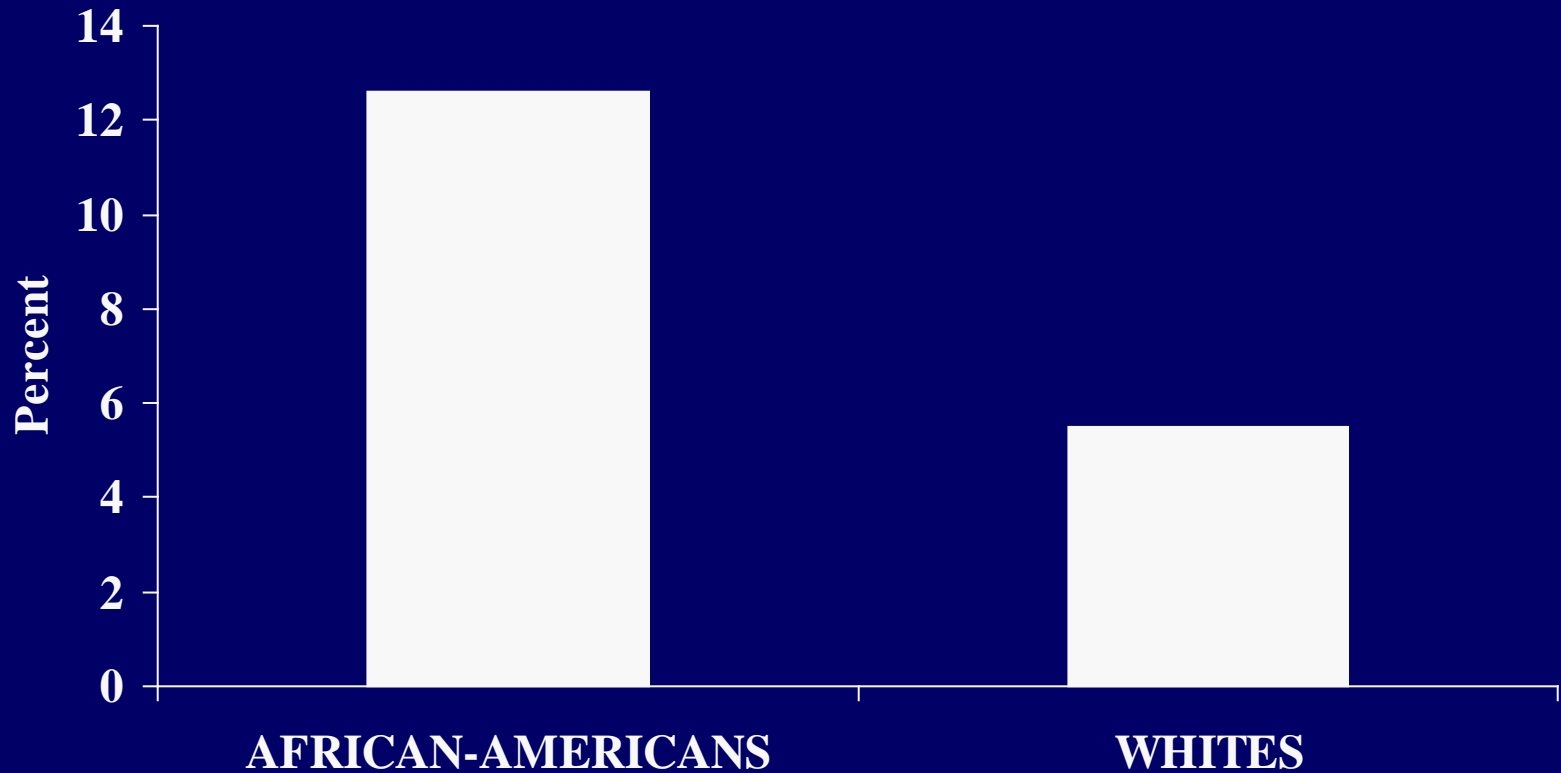


INFANT LBW RATES BY MATERNAL BIRTH WEIGHT AND RACE (LOW-RISK ADULTS)

**College-educated, married mothers who received
adequate PC**

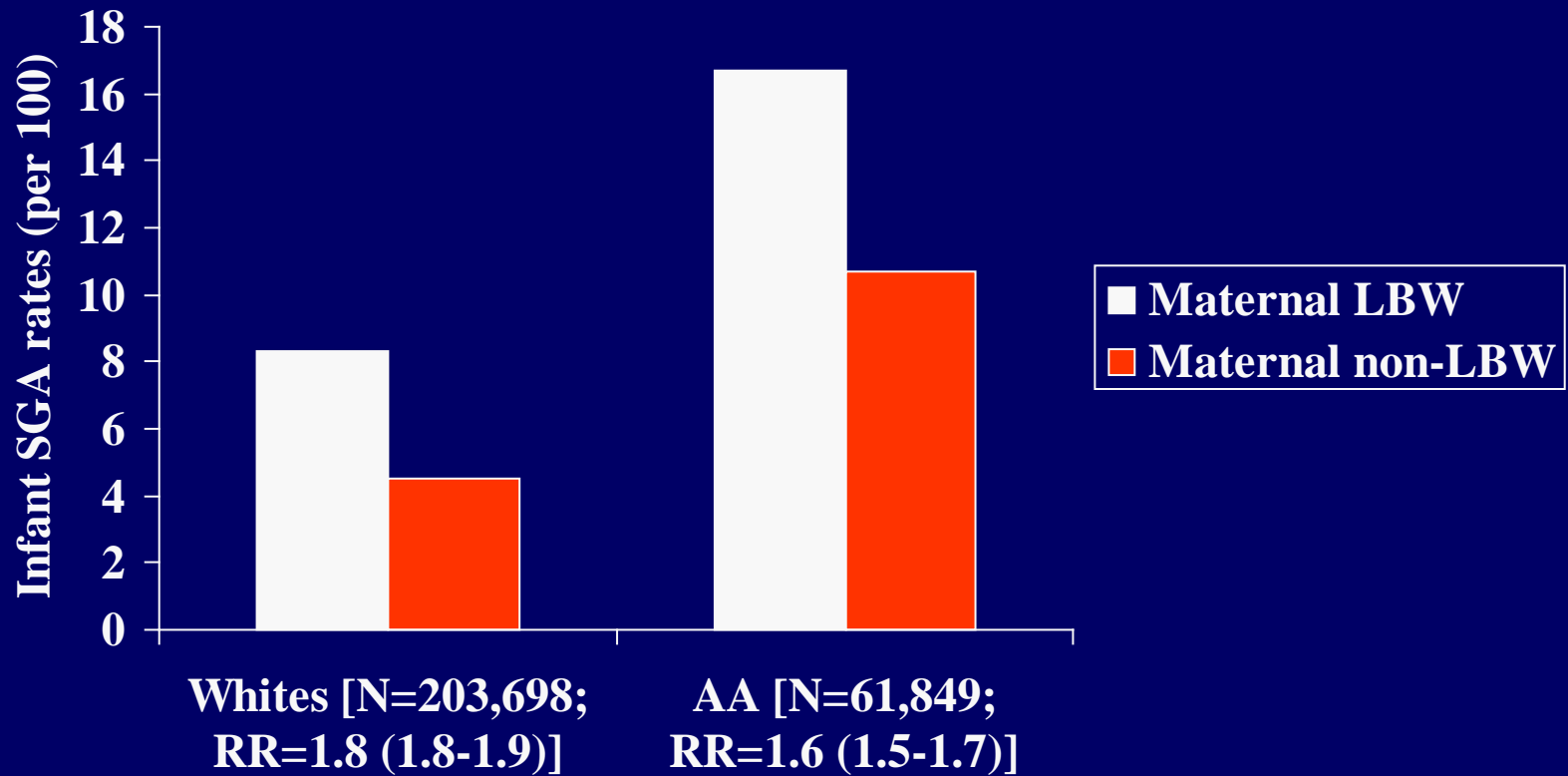


POPULATION ATTRIBUTABLE RISK OF MATERNAL LBW



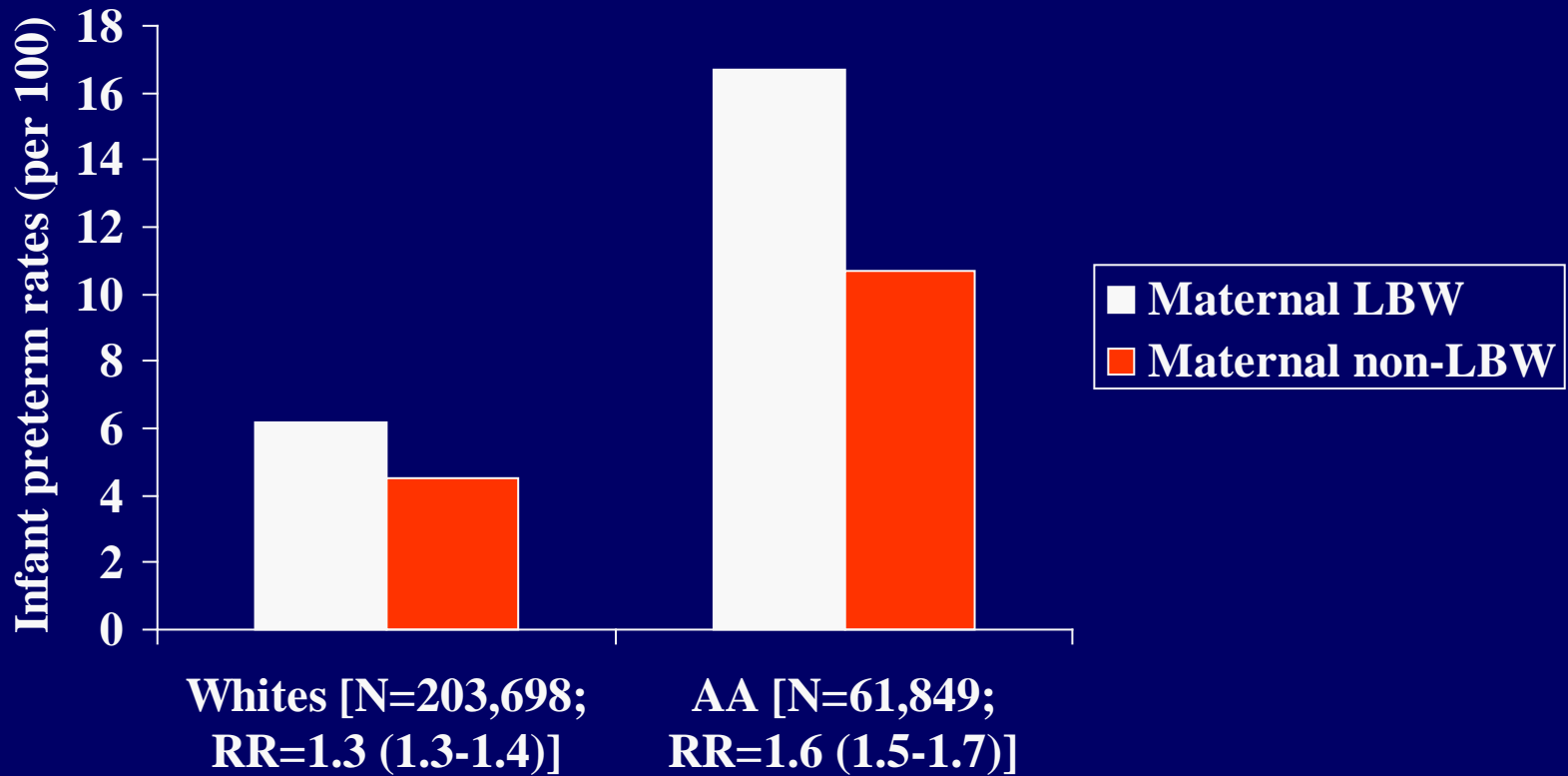
INFANT SGA RATES BY MATERNAL BIRTH WEIGHT AND RACE

(Simon et al, MCHJ, 2006)



INFANT PRETERM RATES BY MATERNAL BIRTH WEIGHT AND RACE

(Simon et al, MCHJ, 2006)





Cumulative Pathways

Percentage of Infants Born Into Poverty

White 4 %

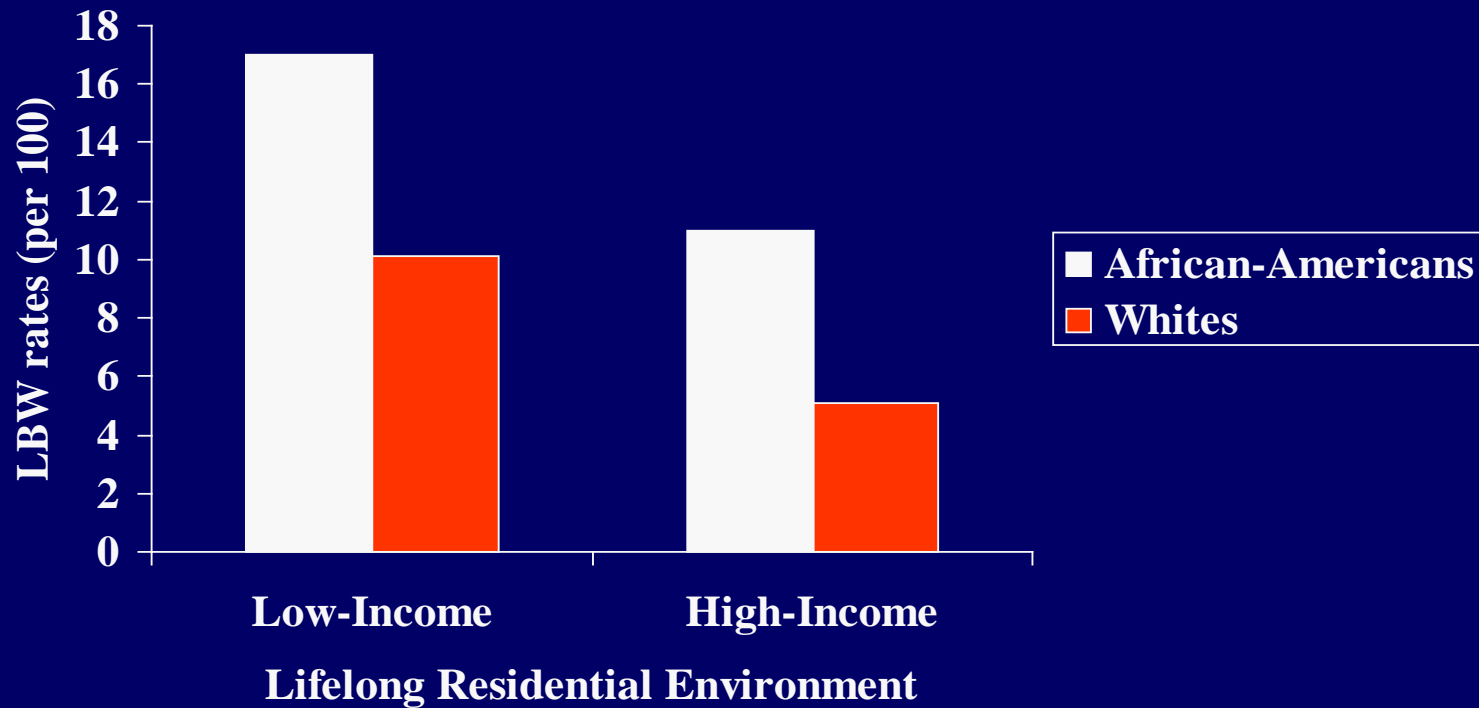
African-American 46%

“for the last few days whole lots of things been going on like shoting, killing, dyeing, death. that happens every day, every week, any month. like they tried to kill my cousin my uncle almost tried to hurt my grandfather to take his money. everywhere you go you see people on streets, in abandon building, on the corners, breaking in houses, getting stopped by police. every day the same things happen.”

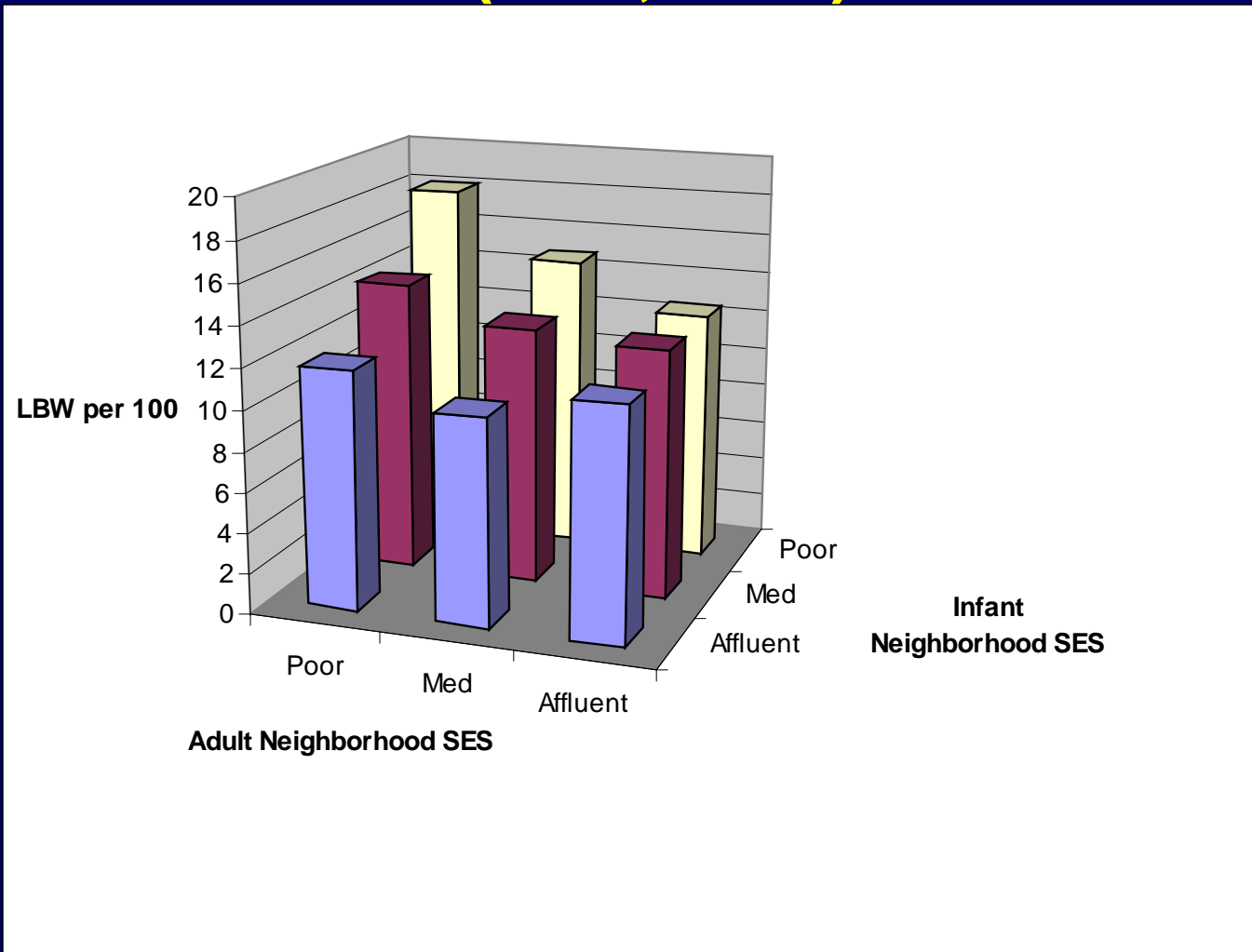
—Composition written by a 6th-grade pupil from Robert Taylor Homes.

RACE-SPECIFIC LBW RATES BY LIFELONG RESIDENTIAL ENVIRONMENT

(Collins et al, in press)



African American Mothers' Lifetime Residential Environment and Infant LBW (PAS, 2007)



- Young and advanced maternal age are known risk factors for infant low birth weight (<2500g, LBW) among Whites.
- A limited literature shows that the risk of infant LBW for African-American women grows monotonically with advancing age.
- Geronimus termed the deterioration in reproductive health status over the childbearing years among African-American women as “weathering” (Ethn Dis, 1992).

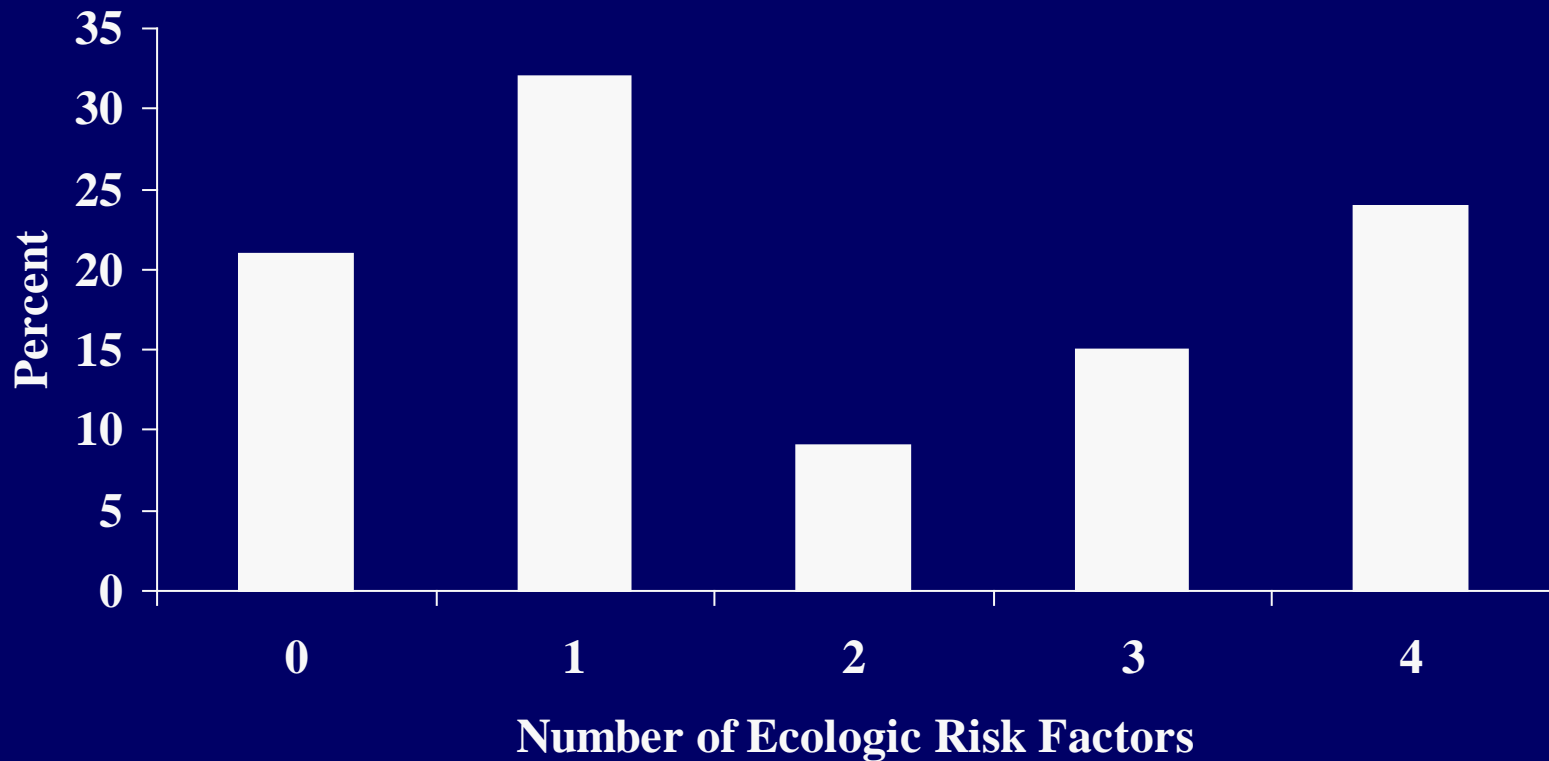
RESEARCH QUESTION

To what extent does neighborhood poverty modify the risk of low birth weight (< 2500g, LBW) associated with advancing age among urban African-American women?

METHODS

- Ecologic Risk Factor (ERF): median family income < \$15,000/yr, unemployment > 19%, homicide rate > 1.3/1,000, lead poisoning rate >2.8/1,000.
- Neighborhoods with four ERF were empirically defined as extremely impoverished.
- Neighborhoods with zero ERF were defined as non-impoverished.

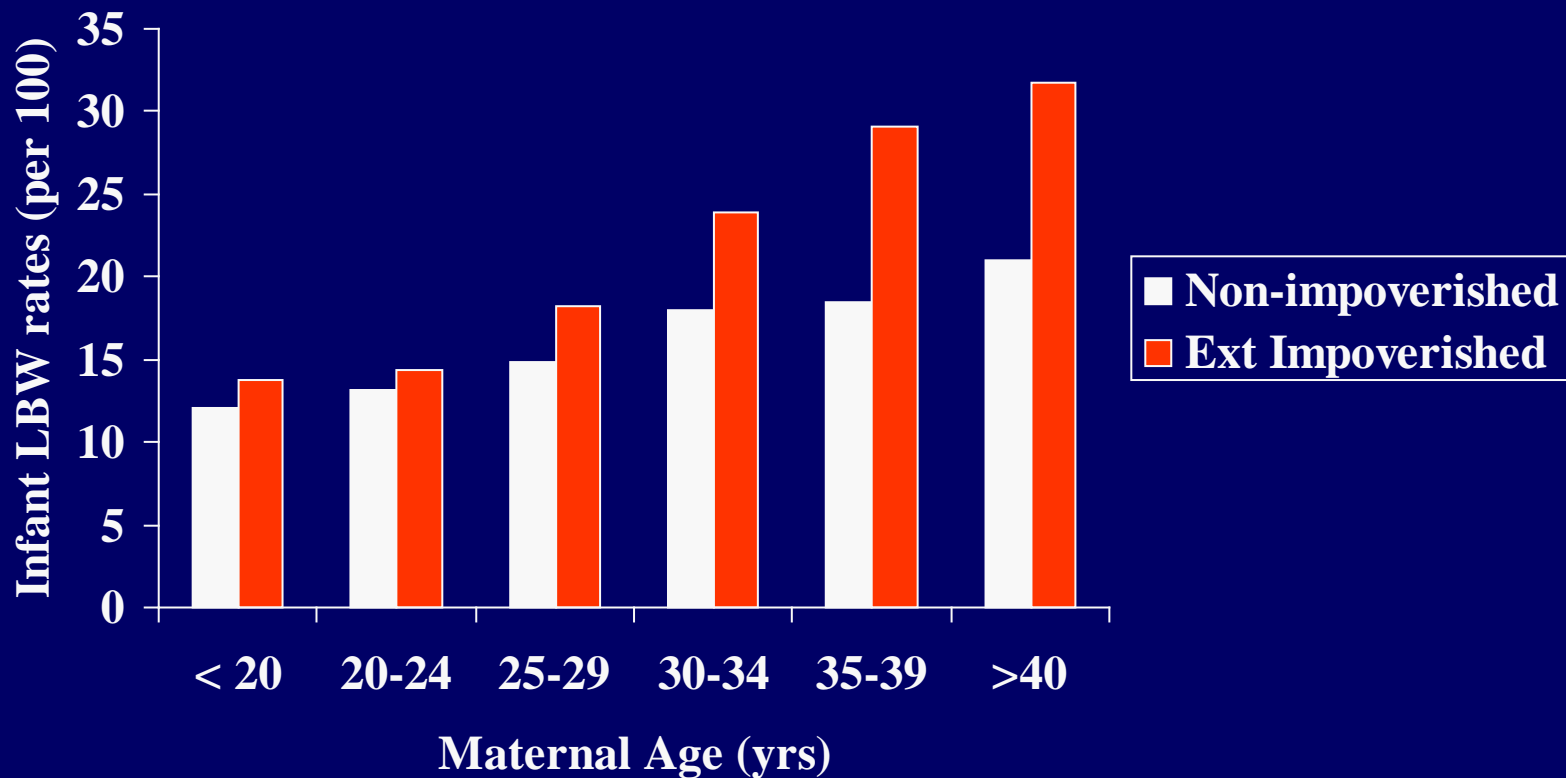
DISTRIBUTION OF AA WOMEN'S (N=104,676) EXPOSURE TO ERF



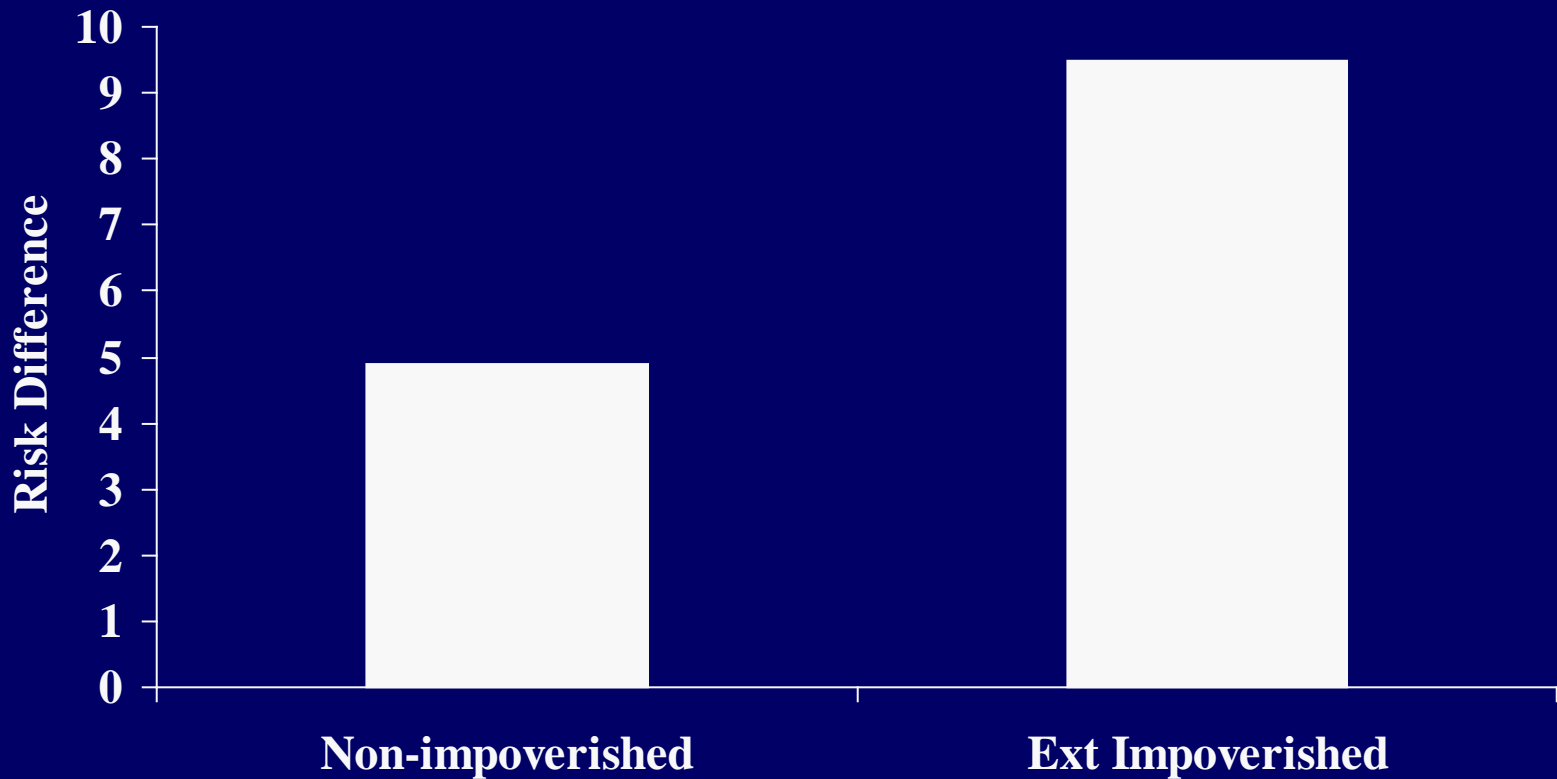
LBW RATES BY MATERNAL AGE AND NEIGHBORHOOD POVERTY:

African-Americans

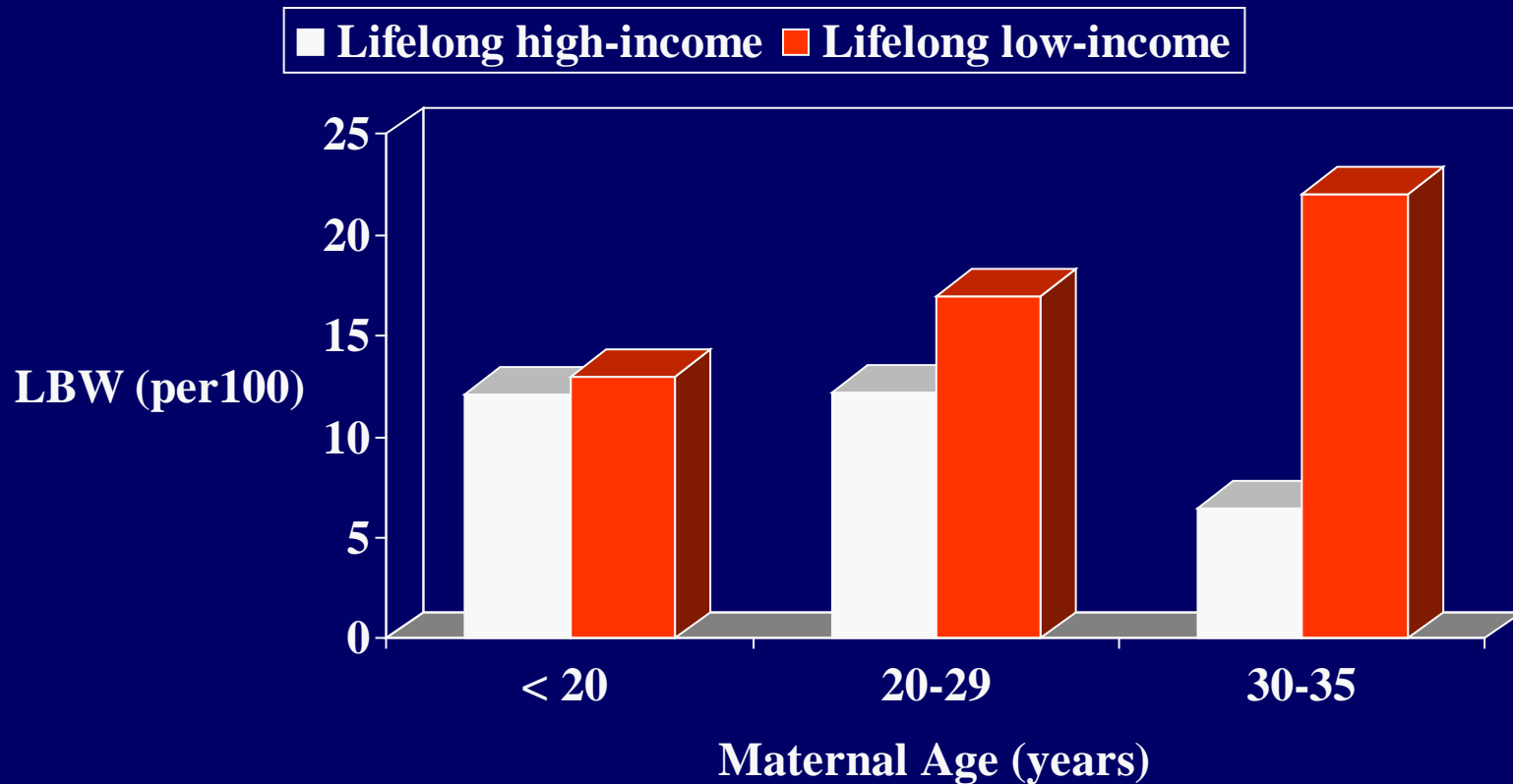
(Collins et al, Ethn Dis, 2006)



***LBW RISK DIFFERENCE BETWEEN
30-34 AND 20-24 YEAR OLD WOMEN BY
NEIGHBORHOOD POVERTY***

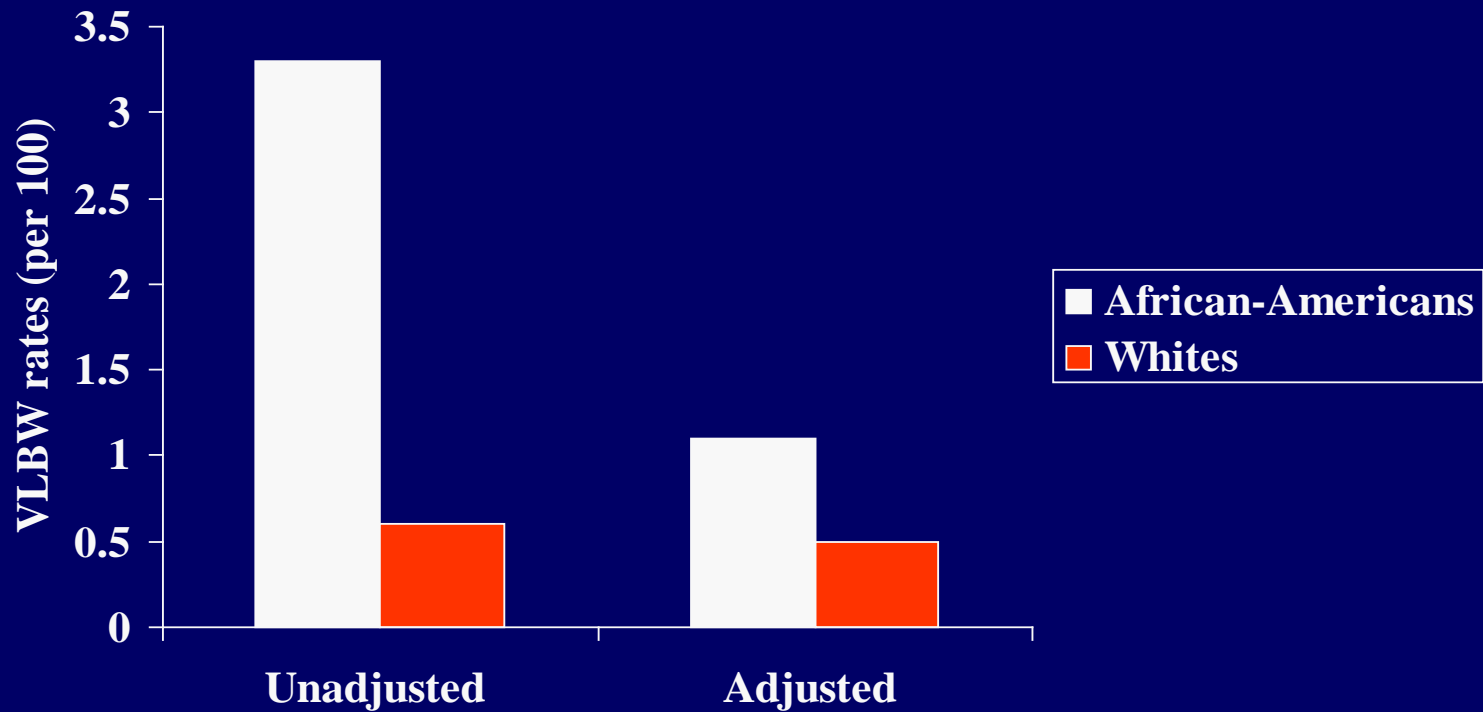


LBW rates by Age and Lifelong Residential Environment among African-American Women; Cook County IL (in press)



VLBW RATES AMONG WOMEN WITH LIFELONG RESIDENCE IN AFFLUENT CHICAGO NEIGHBORHOODS

(Collins et al, Ethn Dis, 2007)



MIDDLE CLASS

**Prosperity still can't buy
security, peace of mind
in black middle-class areas**

By Ron Grossman and Byron P. White

TRIBUNE STAFF WRITERS

Web-posted: Saturday, February 1, 1997

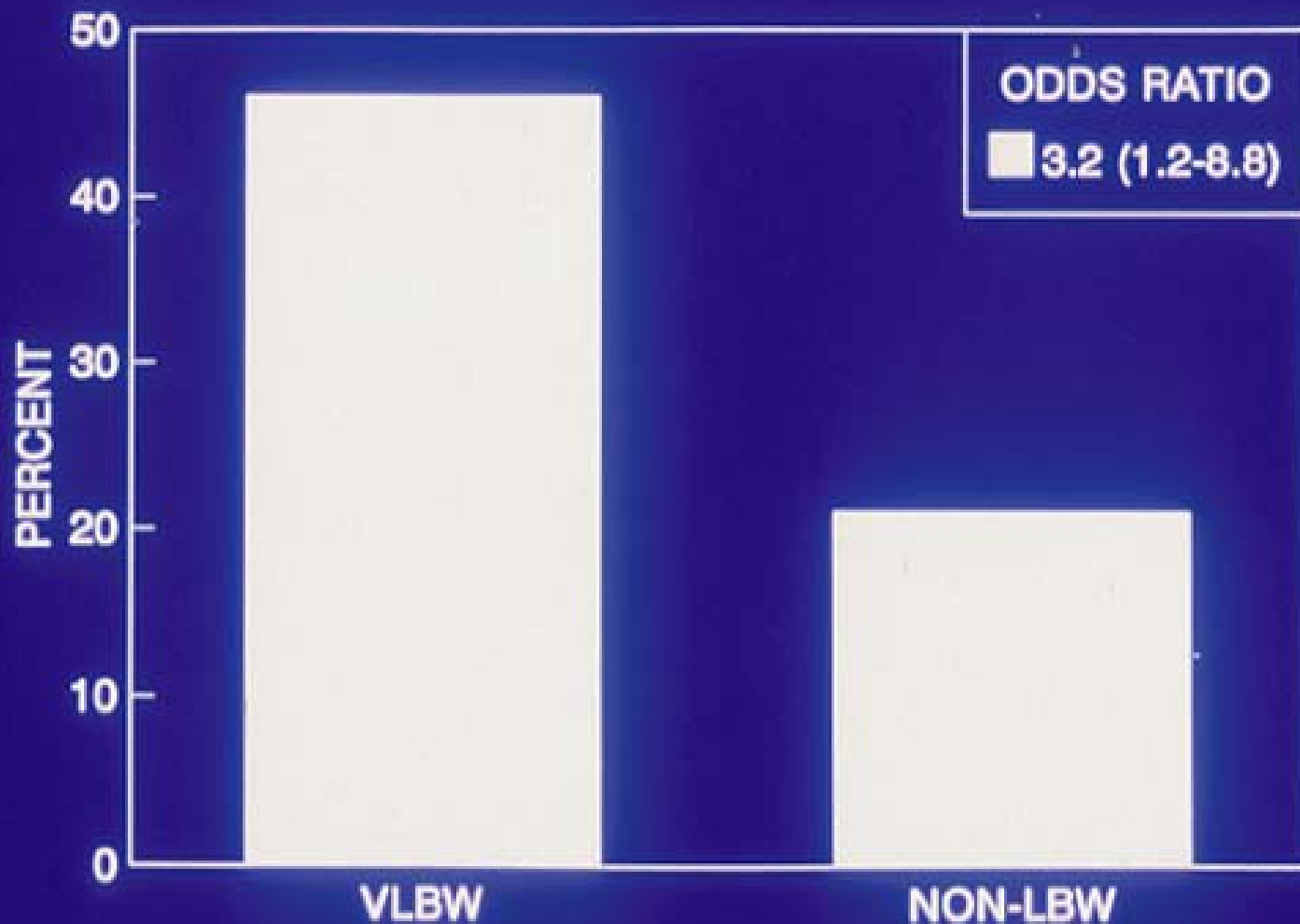
African-American Mothers' Perception of Their Residential Environment, Stressful Life Events, and Very Low Birthweight

James W. Collins, Jr.,¹ Richard J. David,² Rebecca Symons,¹ Arden Handler,³ Stephen Wall,¹ and Steven Andes⁴

VLBW AND UNFAVORABLE RATINGS OF RESIDENTIAL ENVIRONMENT

Low Rating	VLBW	NON-LBW	OR (95% CI)
police	55%	26%	3.2 (1.2-8.4)
property	43%	23%	1.9 (1.1-3.4)
safety	48%	25%	2.8 (1.0-7.4)
friendliness	39%	20%	2.2 (0.8-5.8)
services	29%	19%	1.7 (0.6-5.0)
cleanliness	50%	28%	2.5 (1.0-6.4)
quietness	61%	42%	2.1 (0.8-9.7)
schools	28%	15%	2.8 (0.8-9.7)

VLBW AND UNFAVORABLE RATING (OVERALL) OF RESIDENTIAL ENVIRONMENT



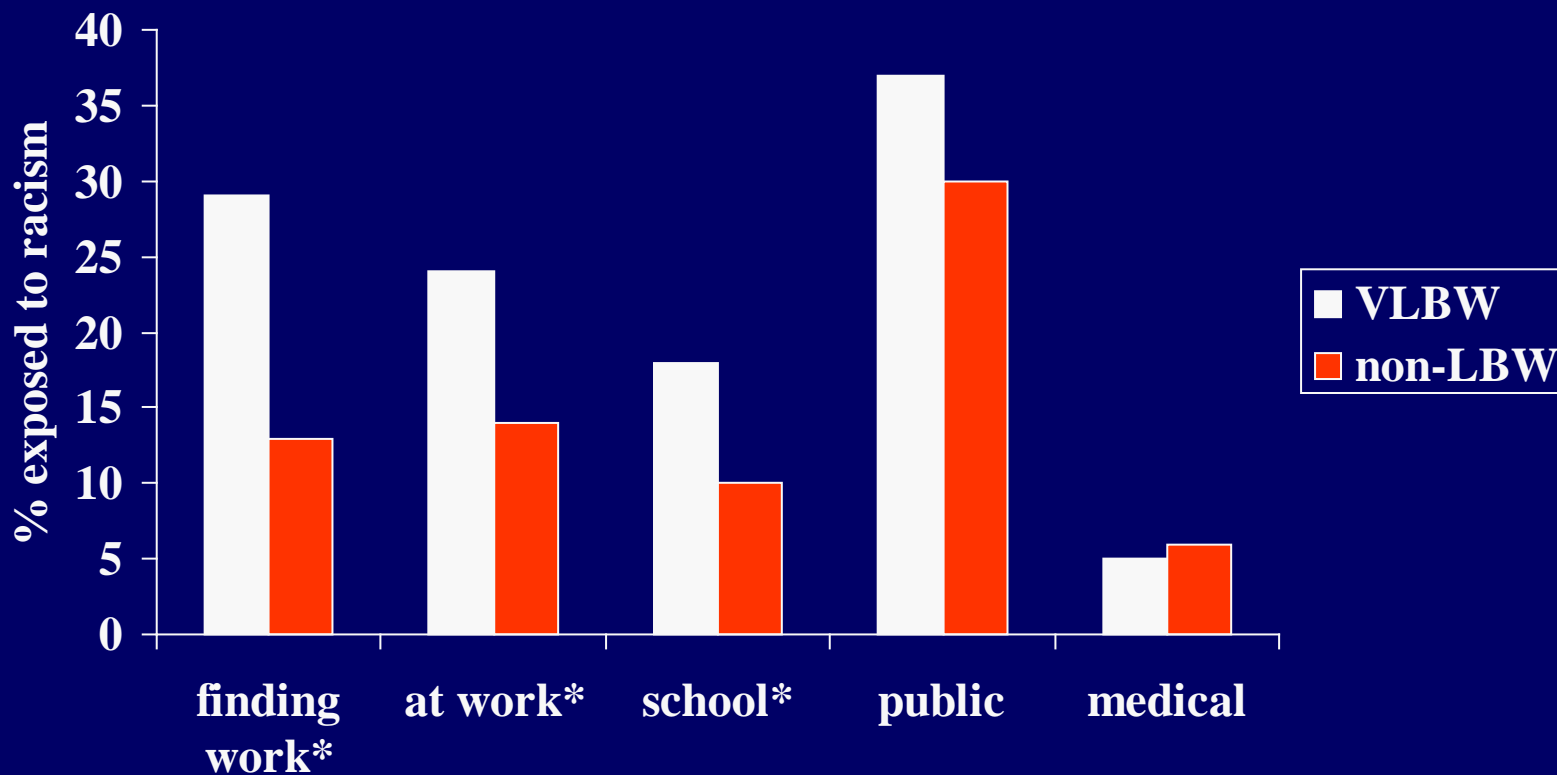
Race

“Race” is not a biological construct that reflects innate differences, but a social construct that precisely captures the impacts of racism.

(Jones, AJPH, 2000)

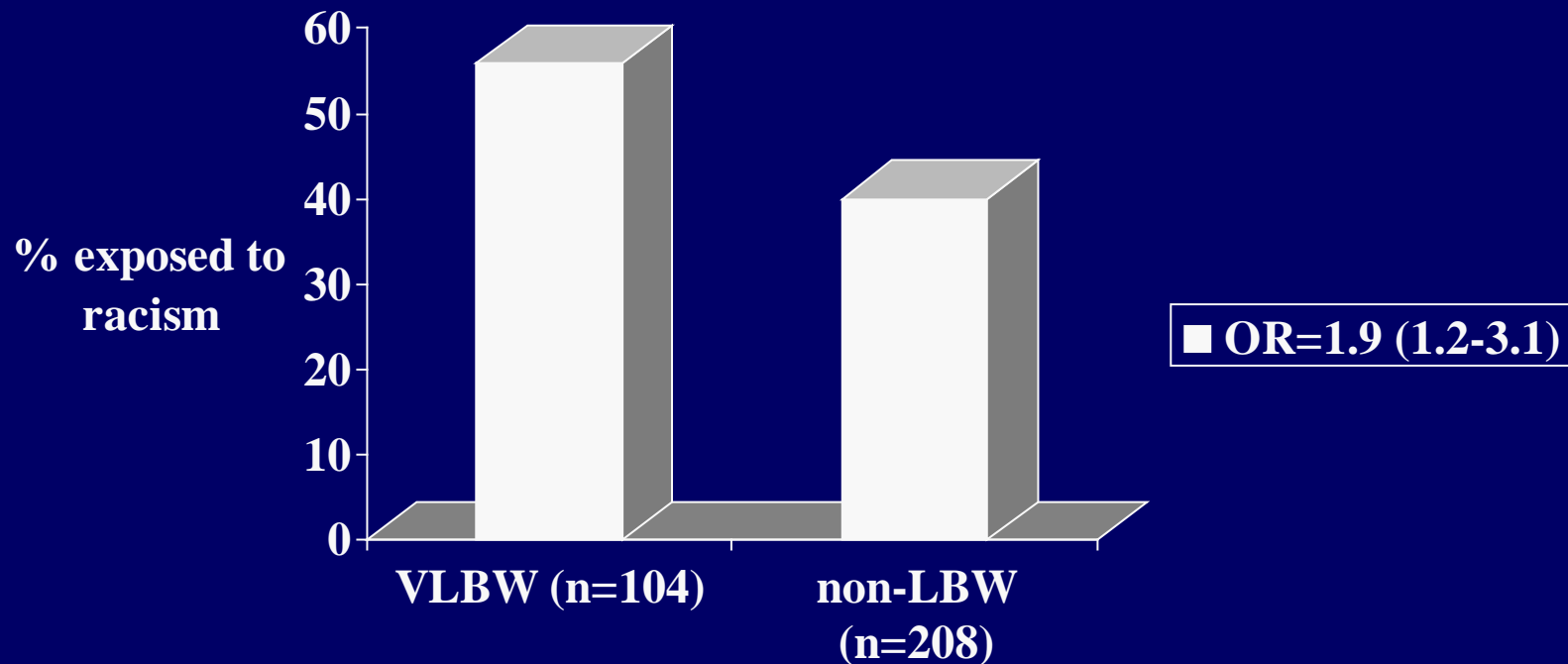
MATERNAL LIFETIME EXPOSURE TO INTERPERSONAL RACISM AND INFANT BIRTH WEIGHT

(Collins et al, AJPH, 2004)



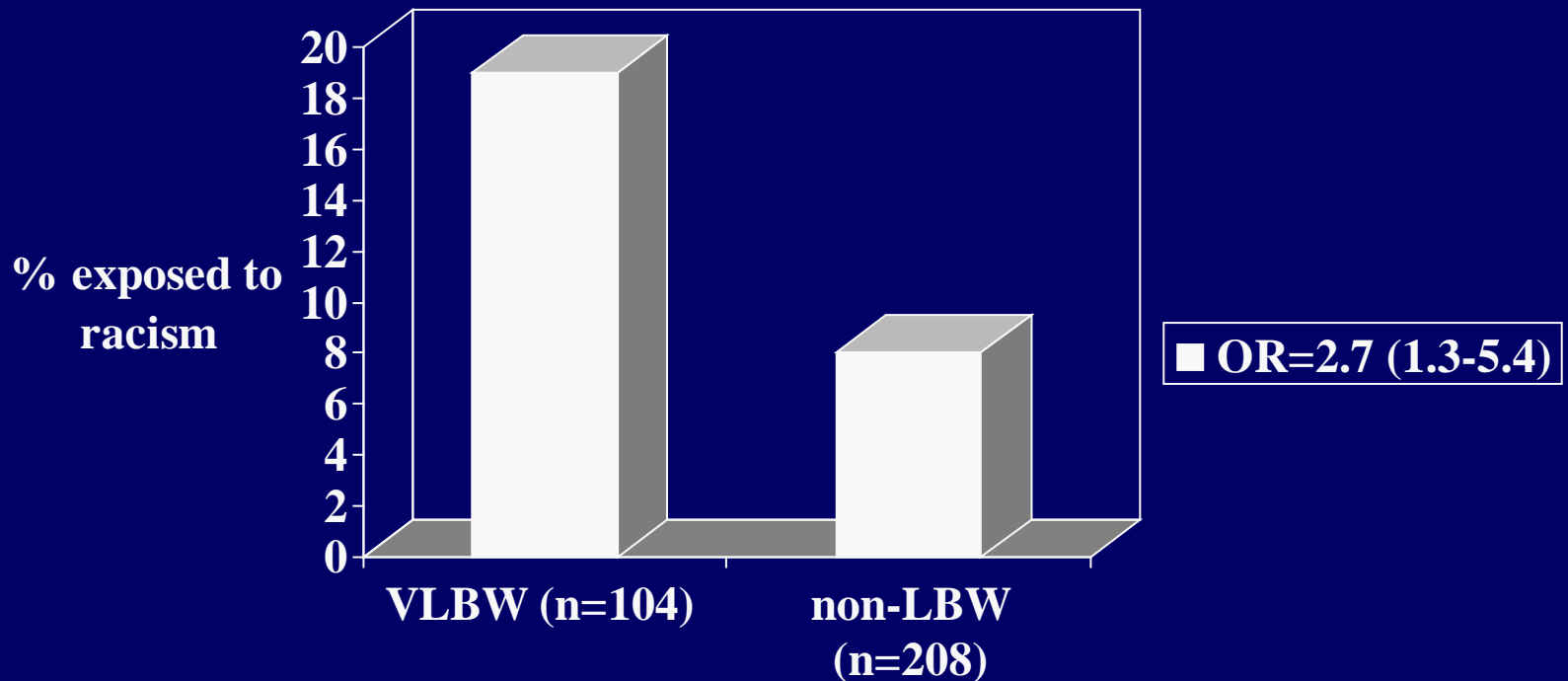
MATERNAL LIFETIME EXPOSURE TO INTERPERSONAL RACISM IN 1 OR MORE DOMAINS AND INFANT BIRTH WEIGHT

(Collins et al, AJPH, 2004)



MATERNAL LIFETIME EXPOSURE TO INTERPERSONAL RACISM IN 3 OR MORE DOMAINS AND INFANT BIRTH WEIGHT

(Collins et al, AJPH, 2004)



LOGISTIC REGRESSION

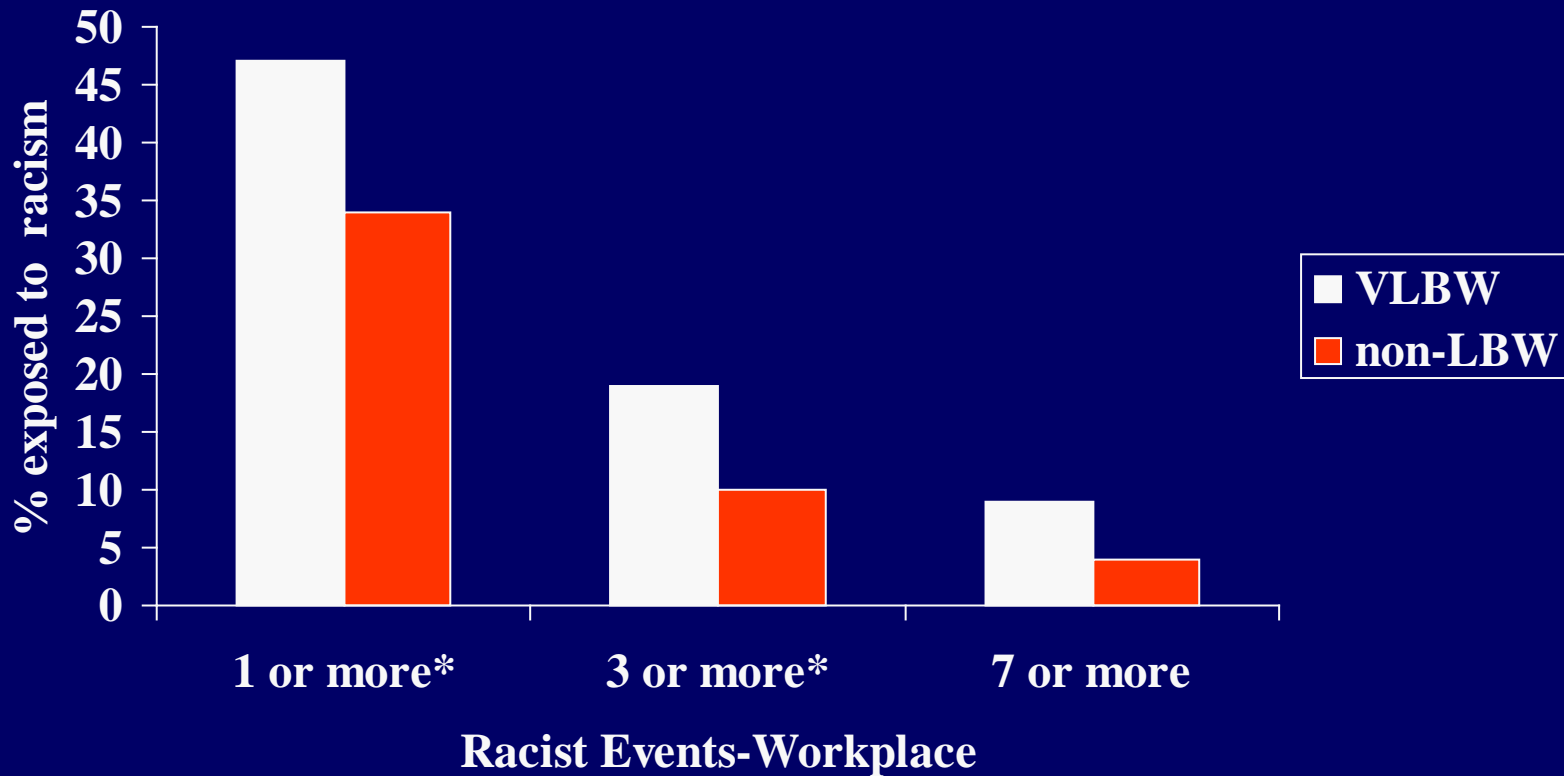
(Collins et al, AJPH, 2004)

- Unadjusted and adjusted OR of VLBW for maternal lifetime exposure to interpersonal racial discrimination in 1 or more domains were 1.9 (1.2-3.1) and 2.3 (1.1-3.6), respectively.
- Unadjusted and adjusted OR of VLBW for maternal lifetime exposure to interpersonal racial discrimination in 3 or more domains were 2.7 (1.3-5.4) and 2.6 (1.2-5.3), respectively.

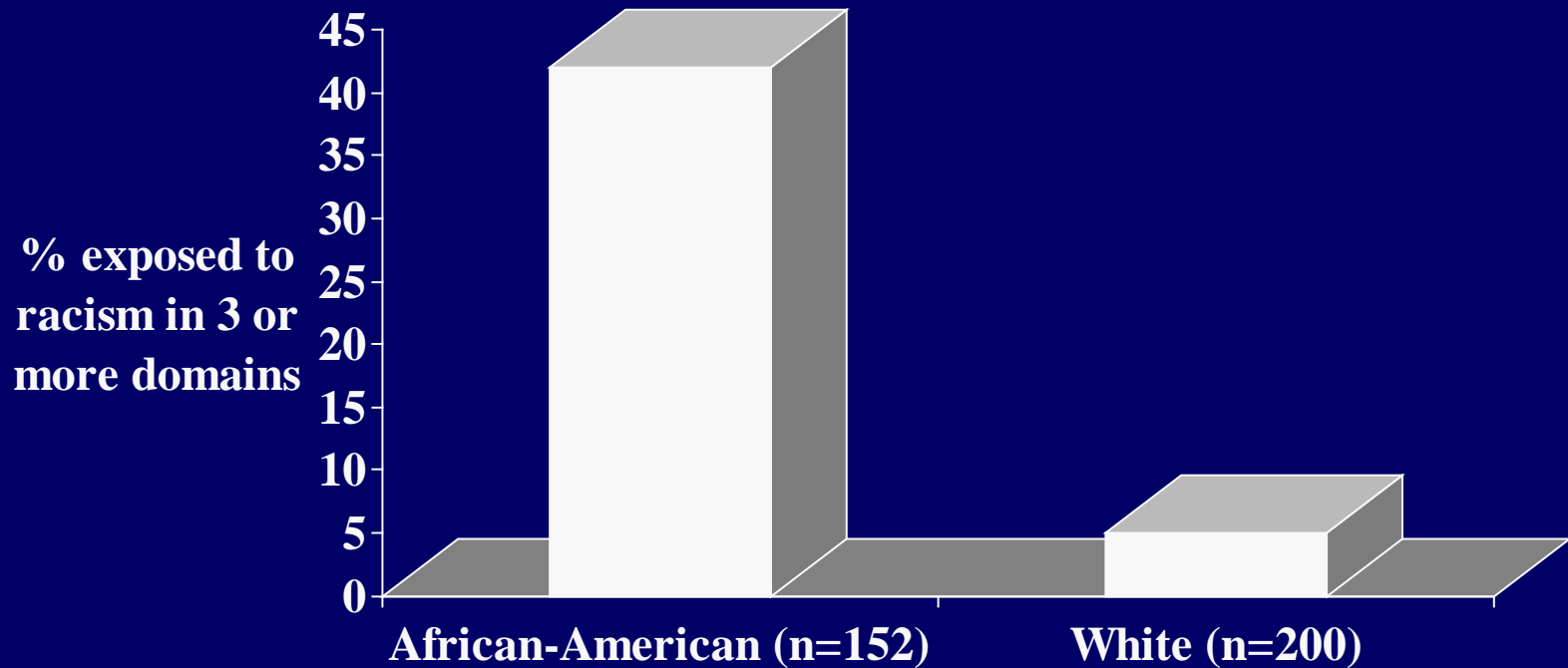
MATERNAL CHRONIC EXPOSURE TO INTERPERSONAL RACISM IN THE WORKPLACE AND INFANT BIRTH WEIGHT

- “You are watched more closely than others because of your race”. OR=2.3 (0.8-6.1)
- “Whites often assume that you work in a lower class job than you do and treat you as such”. OR=2.3 (1.0-5.1)
- “You are treated with less dignity and respect than you would be if you were white”. OR=2.0 (0.8-4.3)

MATERNAL CHRONIC EXPOSURE TO INTERPERSONAL RACISM IN THE WORKPLACE AND INFANT BIRTH WEIGHT



*Self-Reported Experiences of Racial
Discrimination and the Racial Disparity in Preterm
Delivery: the CARDIA Study
(Mustillo et al, AJPH, 2004)*



Racial Discrimination and the Racial Disparity in Low Birth Weight Delivery: the CARDIA Study (Mustillo et al, AJPH, 2004)

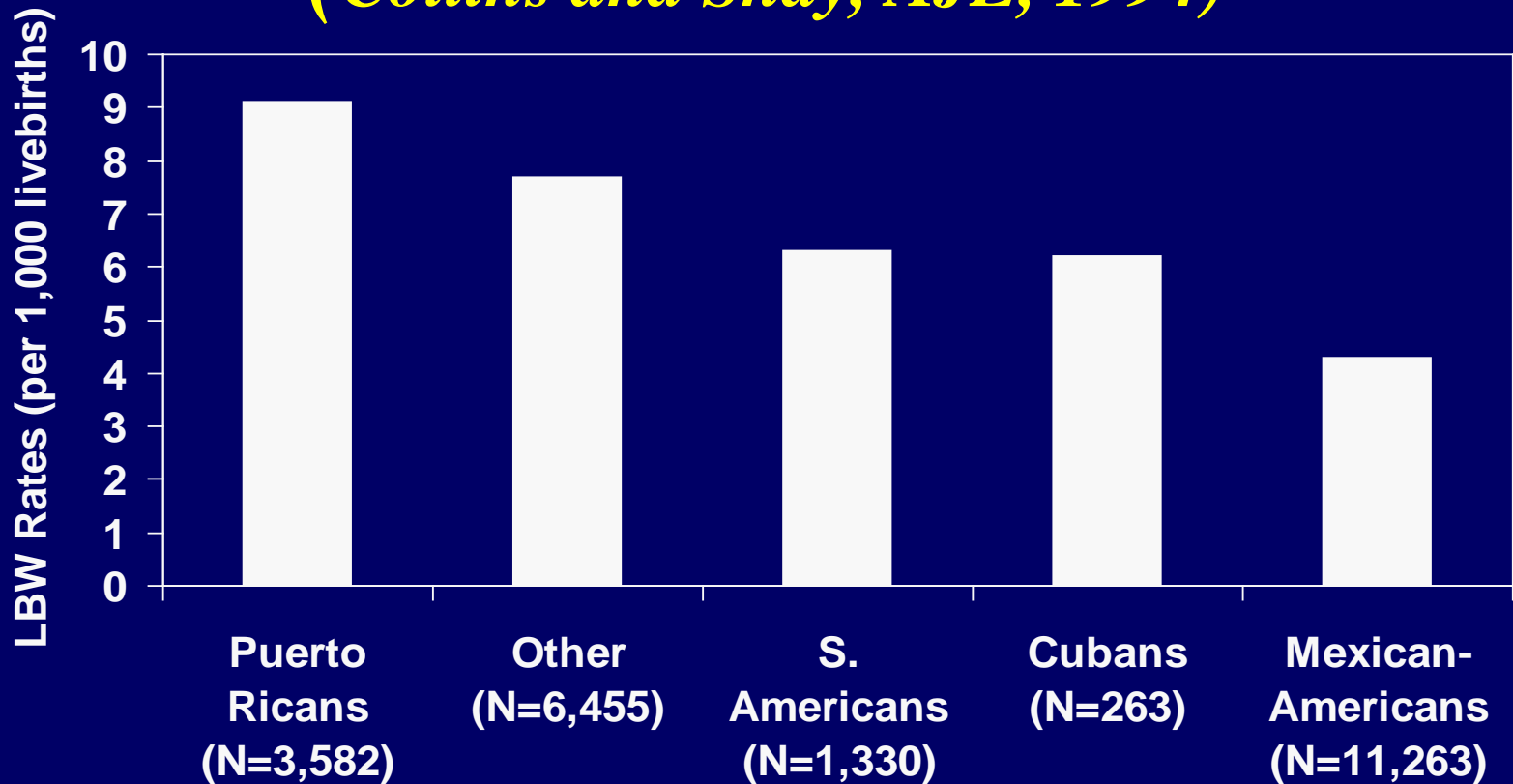
- Unadjusted OR of LBW delivery for African-American (compared to White) women was 4.2 (1.3-13.7).
- Adjusted (racial discrimination) OR of LBW delivery was 2.1 (0.8-5.9).
- Adjusted (racism, SES, depression, alcohol, and tobacco use) OR of LBW delivery was 2.4 (0.8-7.4).

Background

- Latinos quickly becoming the largest minority group in America
- According to the 2000 U.S. Census
 - 35.3 million Latinos in the U.S.
 - 20.6 million (58.5 percent) of Latinos are Mexican
 - Mexican population has increased by 52.9 percent between the 1990 and 2000 census

LBW RATES AMONG LATINOS IN CHICAGO

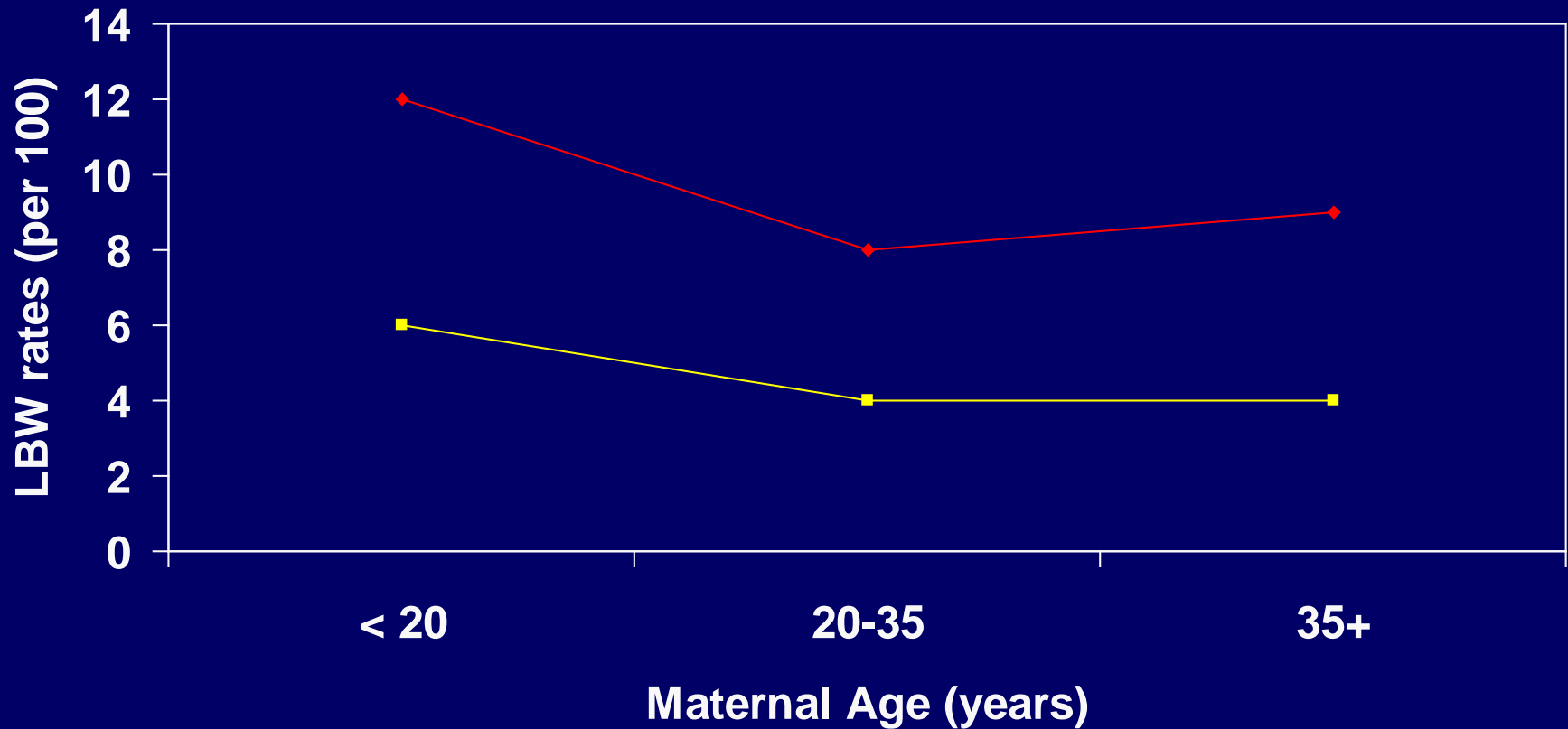
(Collins and Shay, AJE, 1994)



LBW RATES AMONG PR AND MA BY MATERNAL AGE

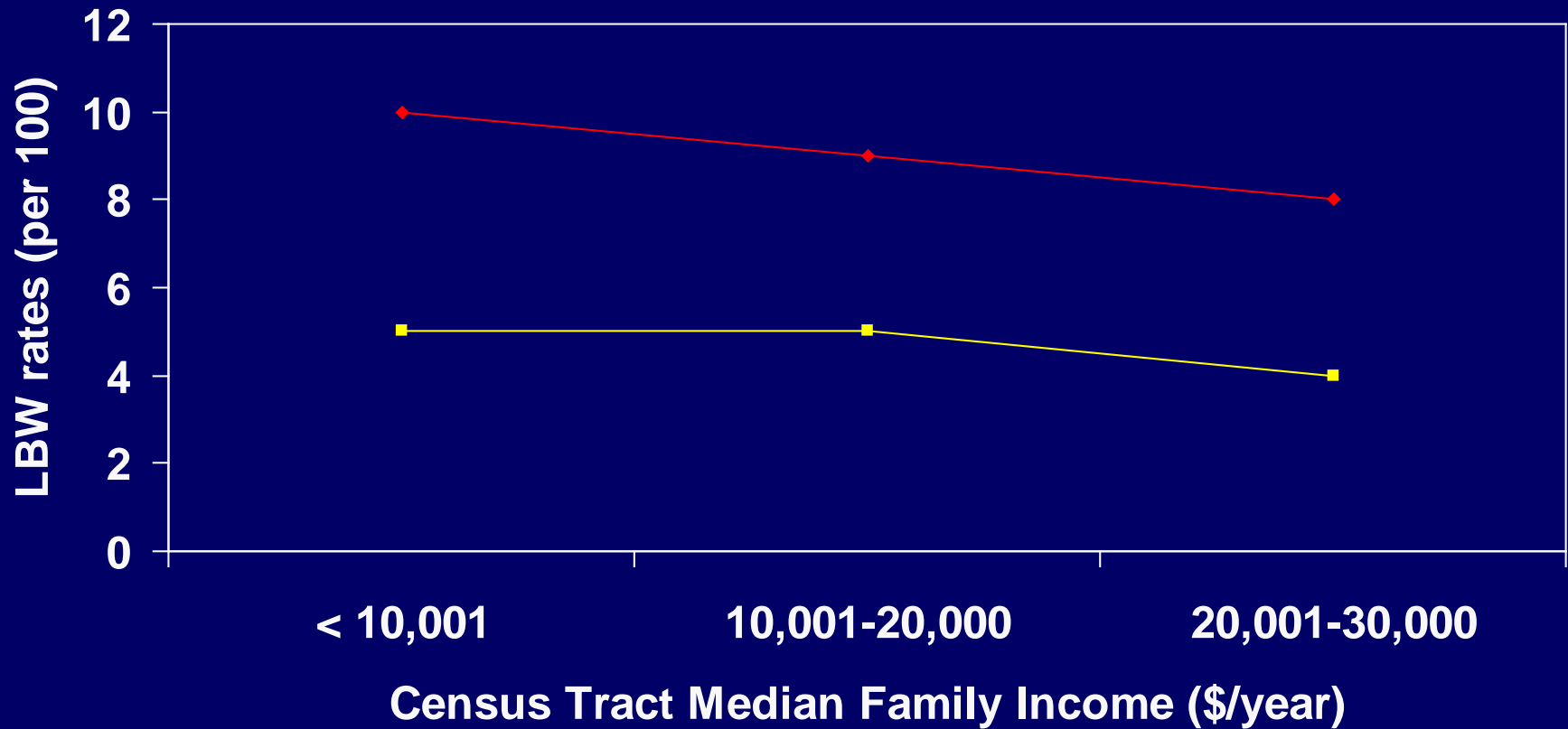
(Collins and Shay, AJE, 1994)

—◆— Puerto Ricans (N=3,582) —■— MA (N=11,263)



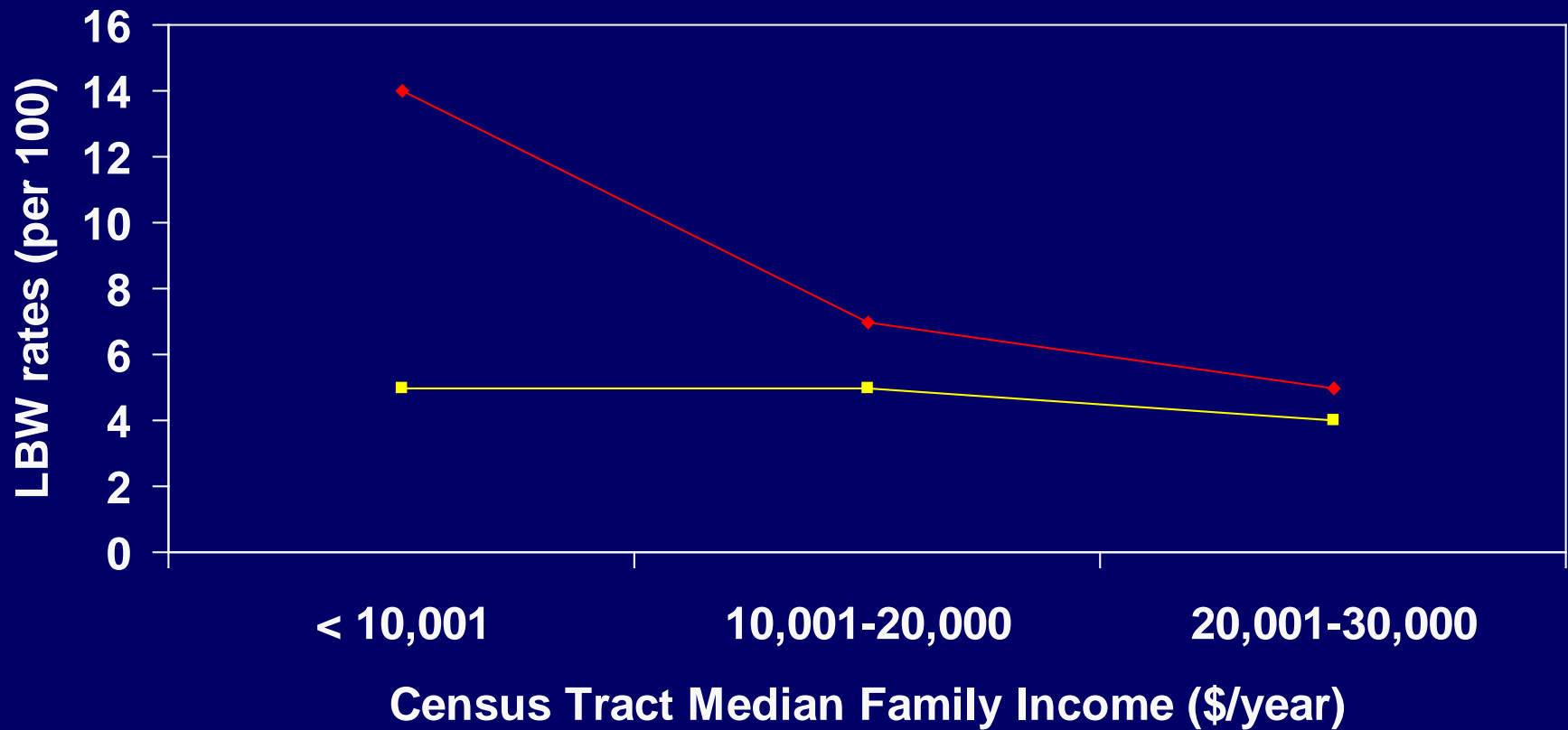
LBW RATES AMONG PR AND MA BY CENSUS TRACT INCCOME (Collins and Shay, AJE, 1994)

◆ Puerto Ricans (N=3,582) ■ MA (N=11,263)



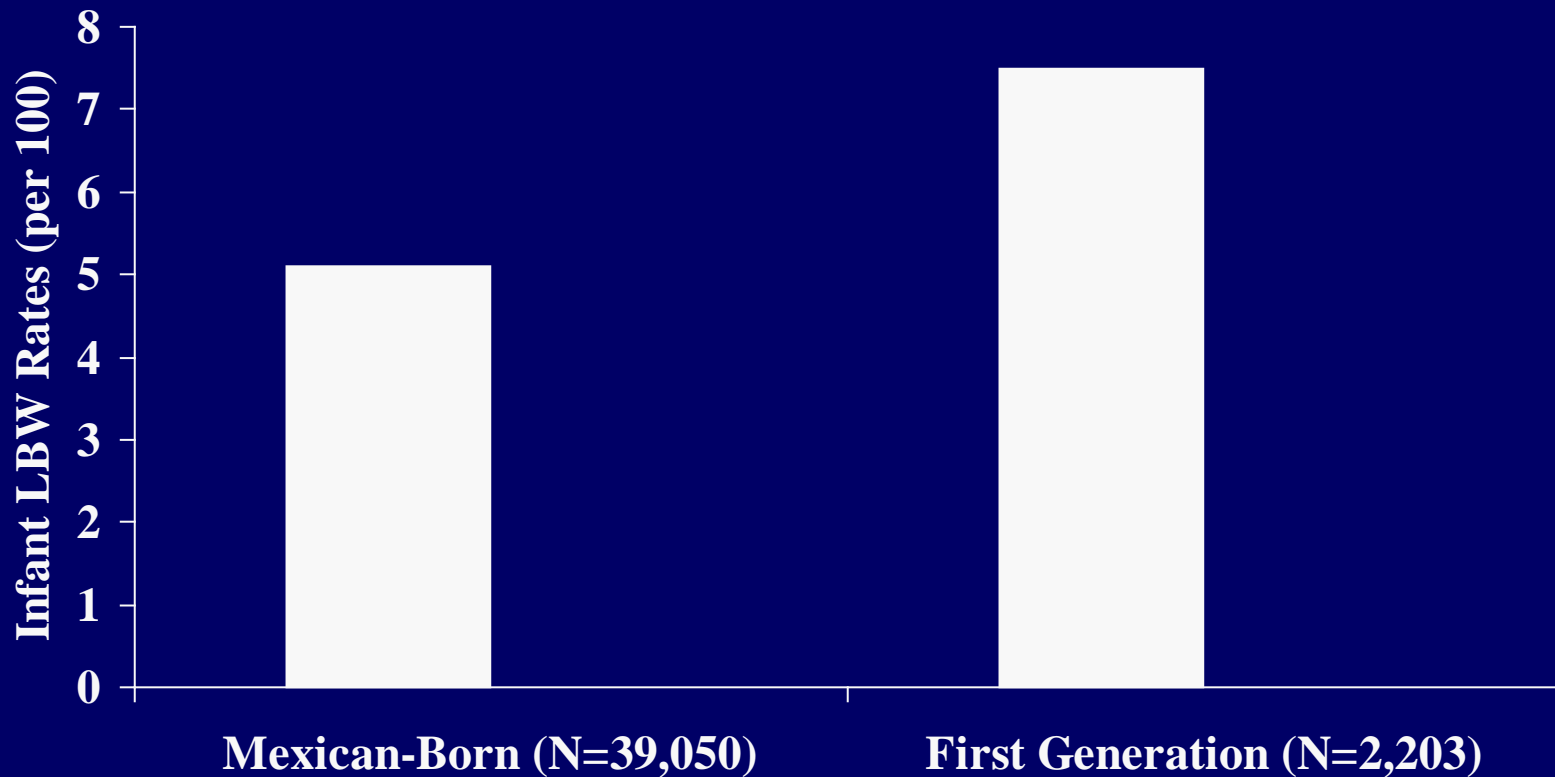
***LBW RATES AMONG MEXICAN-AMERICANS
BY NATIVITY AND CENSUS TRACT INCOME
(Collins and Shay, AJE, 1994)***

◆ U.S.-BORN MA (N=2,300) ■ MEXICAN-BORN (N=8,963)



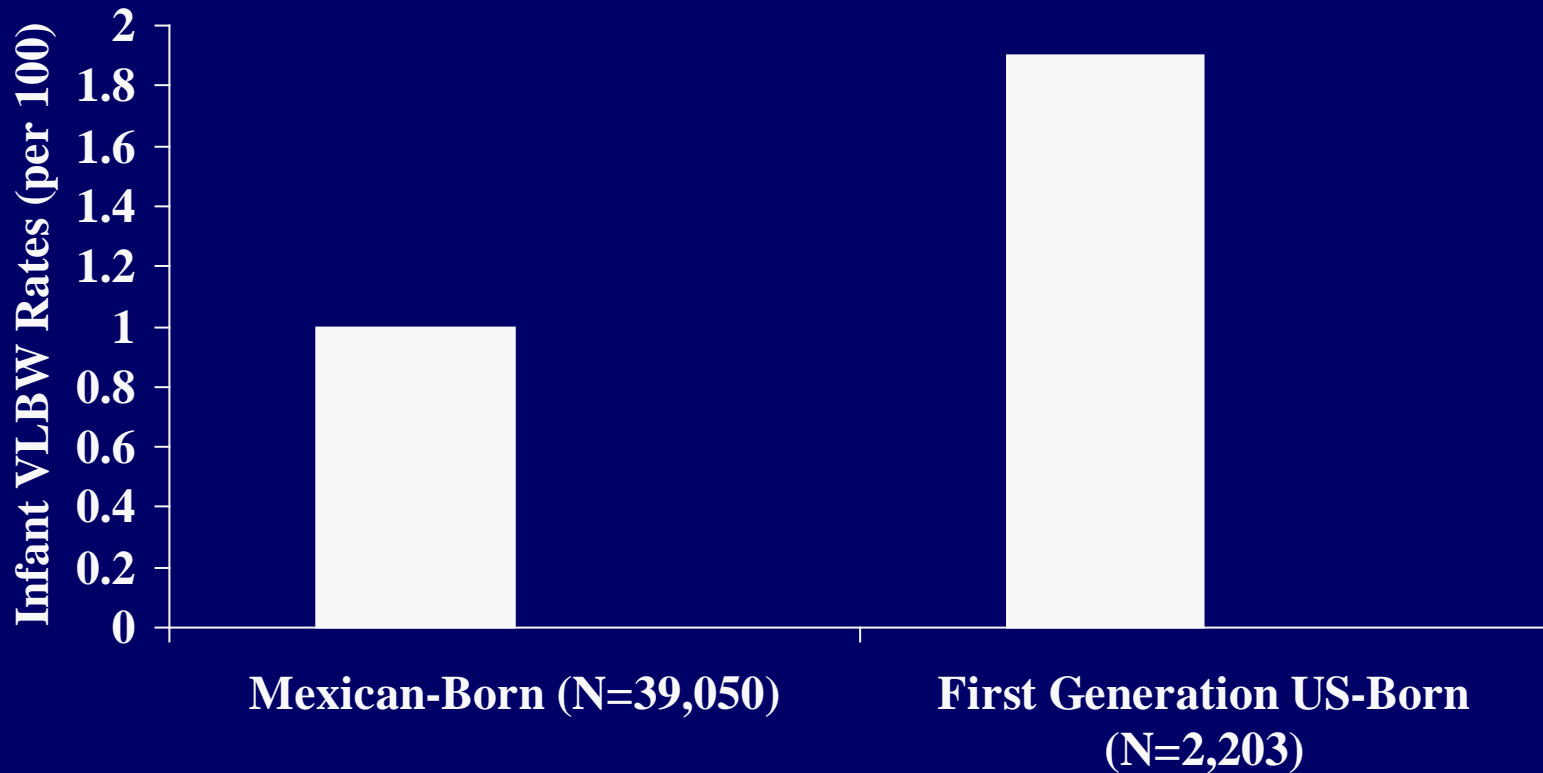
***LBW RATES OF MEXICAN-AMERICANS BY
MATERNAL GENERATIONAL RESIDENCE IN
THE U.S.***

Collins and David, Ethn Dis, 2004)

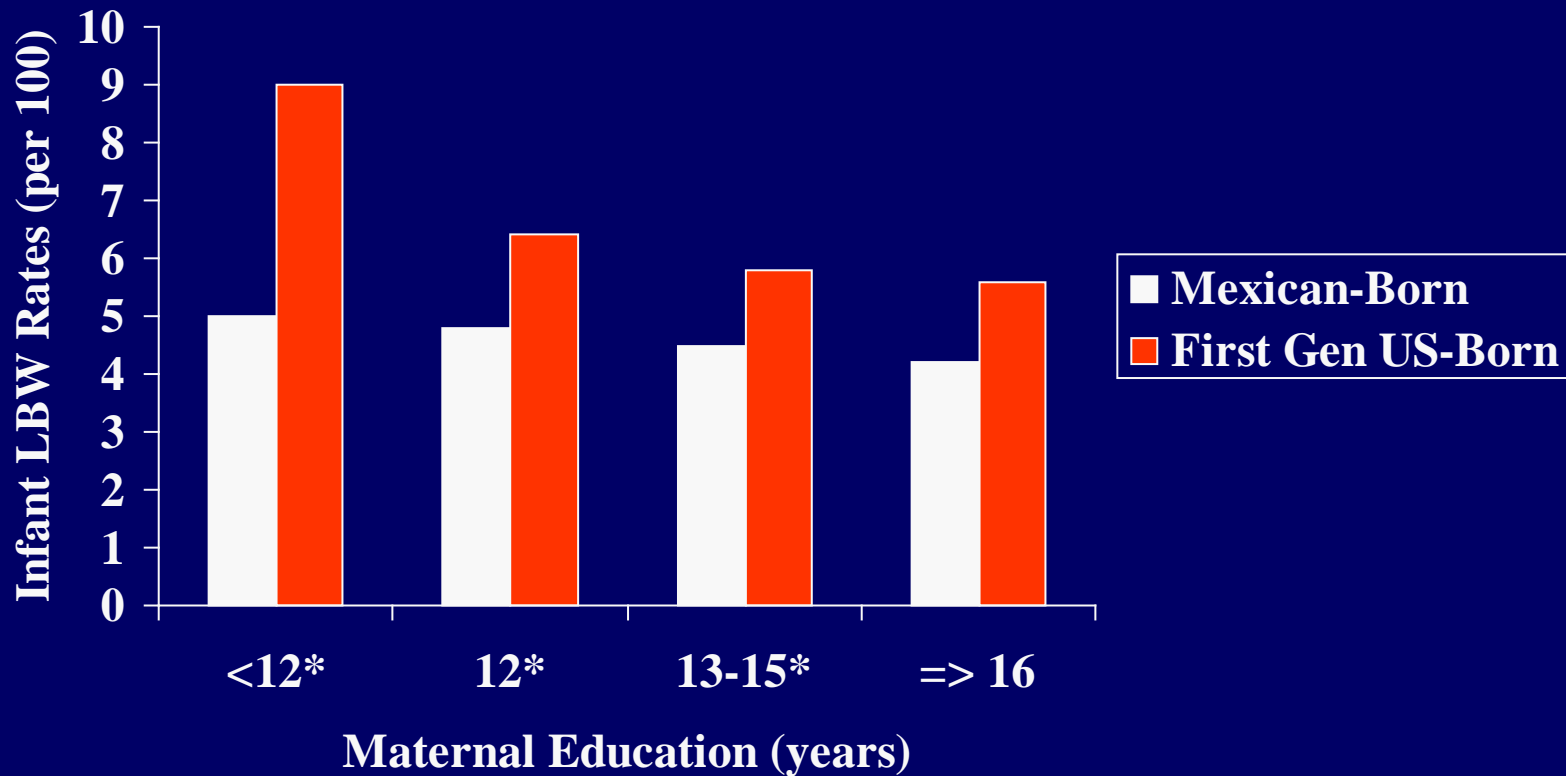


***VLBW RATES OF MEXICAN-AMERICANS BY
MATERNAL GENERATIONAL RESIDENCE IN
THE U.S.***

Collins and David, Ethn Dis, 2004)



LBW RATES OF MEXICAN-AMERICANS BY MATERNAL NATIVITY AND EDUCATION



Study Objective

- To explore the extent to which lifelong exposure to neighborhood poverty affects infant LBW rates of first generation U.S.-born Mexican-American women

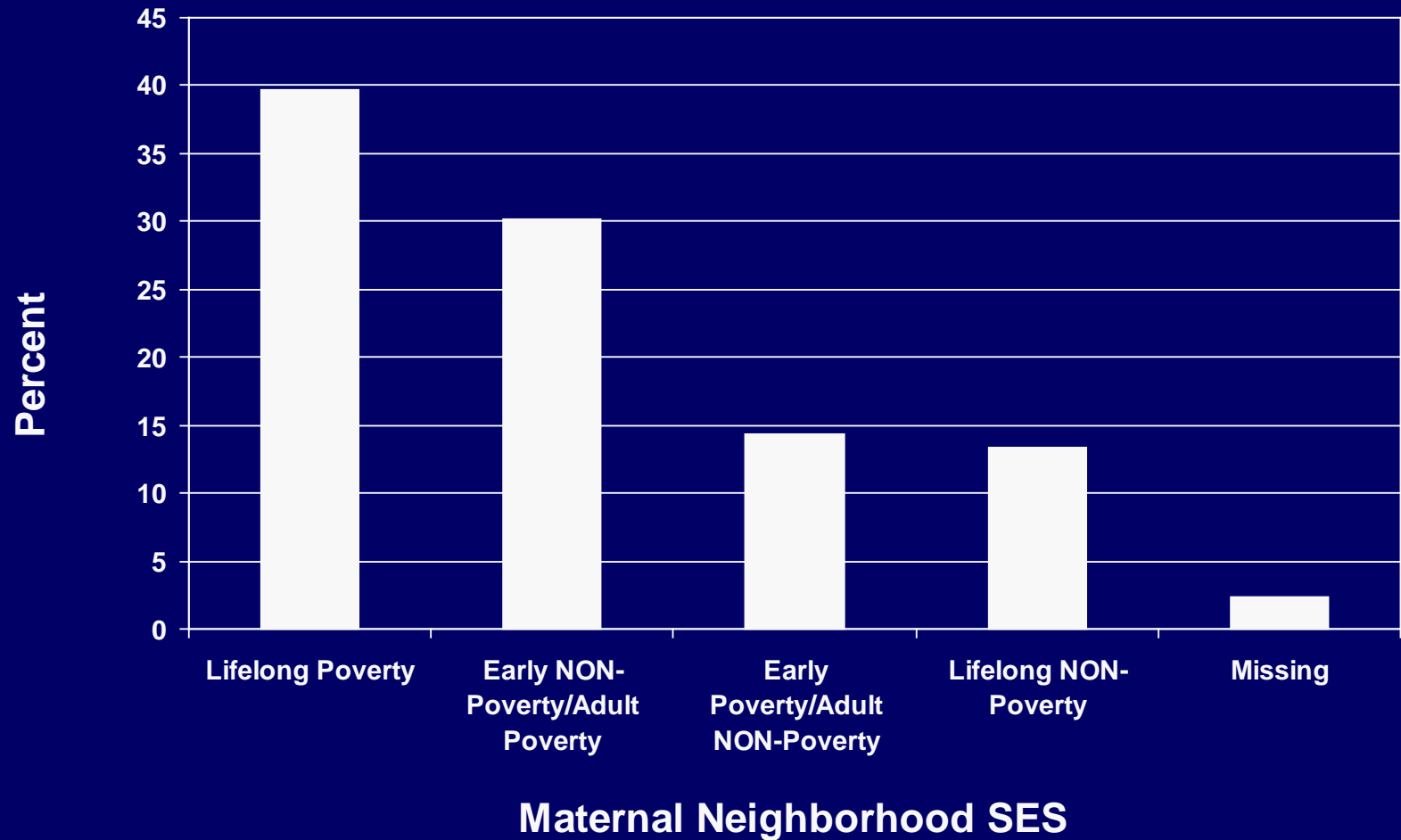
Methods

- Neighborhood poverty was defined as census tract median family income less than the 50th percentile
- Neighborhood socioeconomic status (SES) was determined at two points in woman's life:
 - Time of her birth
 - Time of her pregnancy
- Maternal individual variables: age, education, parity, prenatal care, and cigarette smoking
- Rates of infant low birth weight (< 2500g, LBW) were calculated

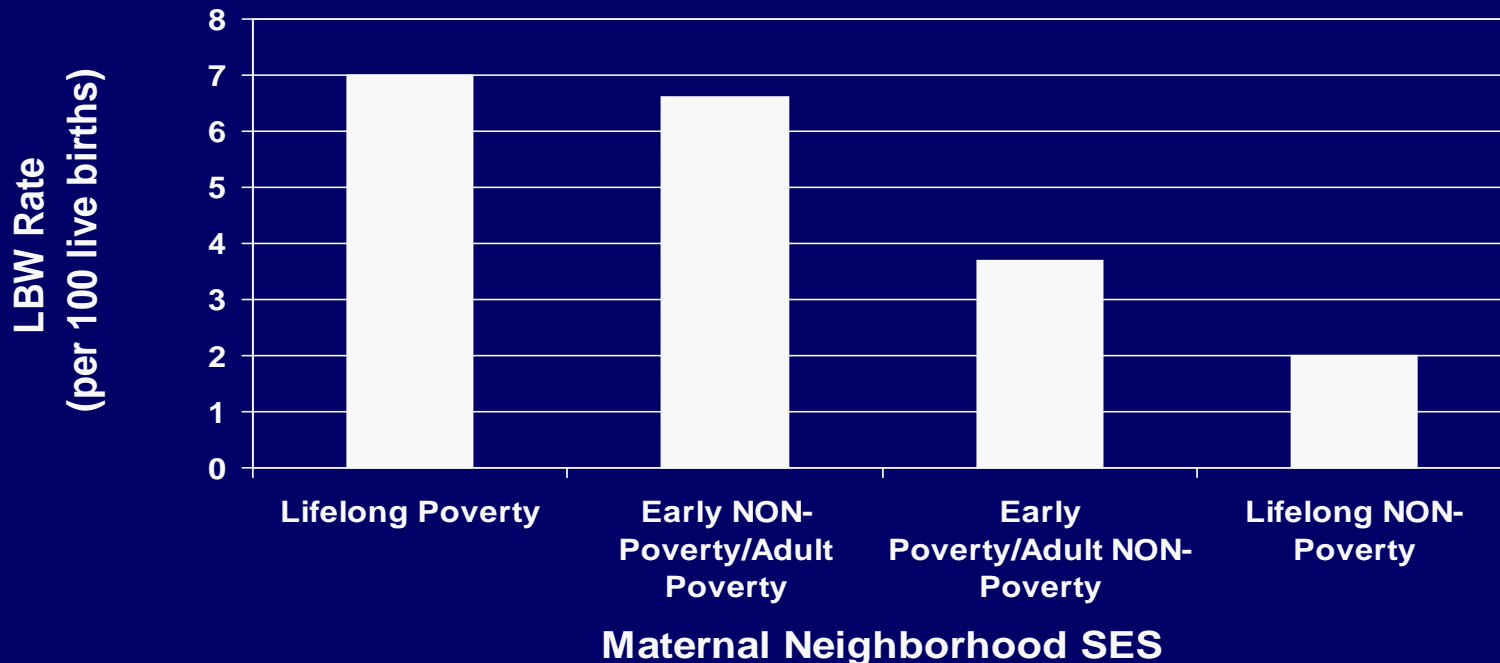
Methods

- 1989-1991 Illinois computerized birth certificates of singleton infants born to first generation Mexican-American women
- Based on mother's full maiden name and exact date of birth, linked 79% (N=1,511) of maternal birth records (1956-1975) to infant records(1989-1991)
- Appended 1990 US census income data to each infant record
- Appended 1960 US census income data to each maternal record

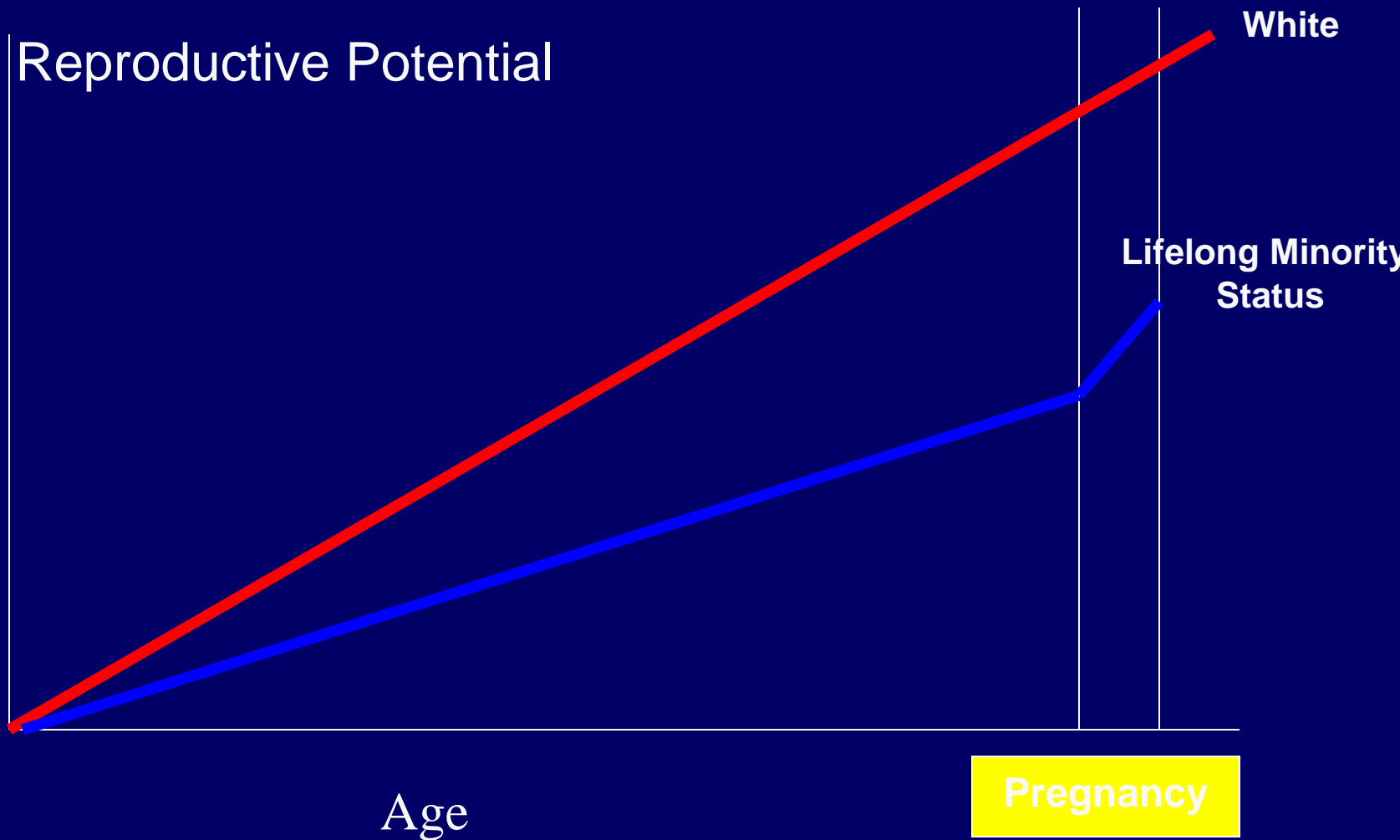
Distribution of Neighborhood SES



LBW Rates According to Neighborhood SES (unpublished)



Life Course Perspective





Disparities

Bad Housing

Weathering

Social policy

Unemployment

Bad Neighborhoods

Hopelessness

Stress

Poverty

Adverse Environmental conditions

Limited Access
to Care

Smoking

Under-
Education

Family Support

Poor Working Conditions


Racism

Lack of access
to good Nutrition




A 12-Point Plan: Lu and colleagues

- **1. Provide interconception care to women with prior adverse pregnancy outcomes**
- **2. Increase access to preconception care for African American women**
- **3. Improve the quality of prenatal care**
- **4. Expand healthcare access over the life course**
- **5. Strengthen father involvement in African American families**
- **6. Enhance service coordination and systems integration**
- **7. Create reproductive social capital in African American communities**
- **8. Invest in community building and urban renewal**
- **9. Close the education gap**
- **10. Reduce poverty among African-Americans**
- **11. Support working mothers**
- **12. Undo racism: institutional, interpersonal**



All of this will not be finished in the first 100 days. Nor will it be finished in the first 1,000 days, not in the life of your Administration, nor even perhaps in our lifetime on this planet. But let us begin.

John F Kennedy (1961)



*I have a dream that my four little children
will one day live in a nation where they
will not be judged by the color of their
skin, but by the content of their character*

Martin Luther King, Jr (1963)

Let America be America again.
Let it be the dream it used to be....
O, let America be America again—
The land that never has been yet—
And yet must be—
the land where *every* man is free.

Langston Hughes