Starting Early:

A Life Course Perspective on Child Health Disparities

Tina L. Cheng, MD, MPH

October 2012

JOHNS HOPKINS UNIVERSITY
SCHOOL OF NURSING

JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH

JOHNS HOPKINS MEDICINE

JOHNS HOPKINS CONSORTIUM of HEALTH DISPARITIES CENTERS

CENTERS FOR POPULATION HEALTH AND HEALTH DISPARITIES
CPHHD

Hopkins Center to Eliminate Cardiovascular Health Disparities

Hopkins Center for Health Disparities Solutions

Johns Hopkins Urban Health INSTITUTE

JOHNS HOPKINS CRCD
CENTER TO REDUCE CANCER DISPARITIES

DC-Baltimore Research Center on Child Health disparities

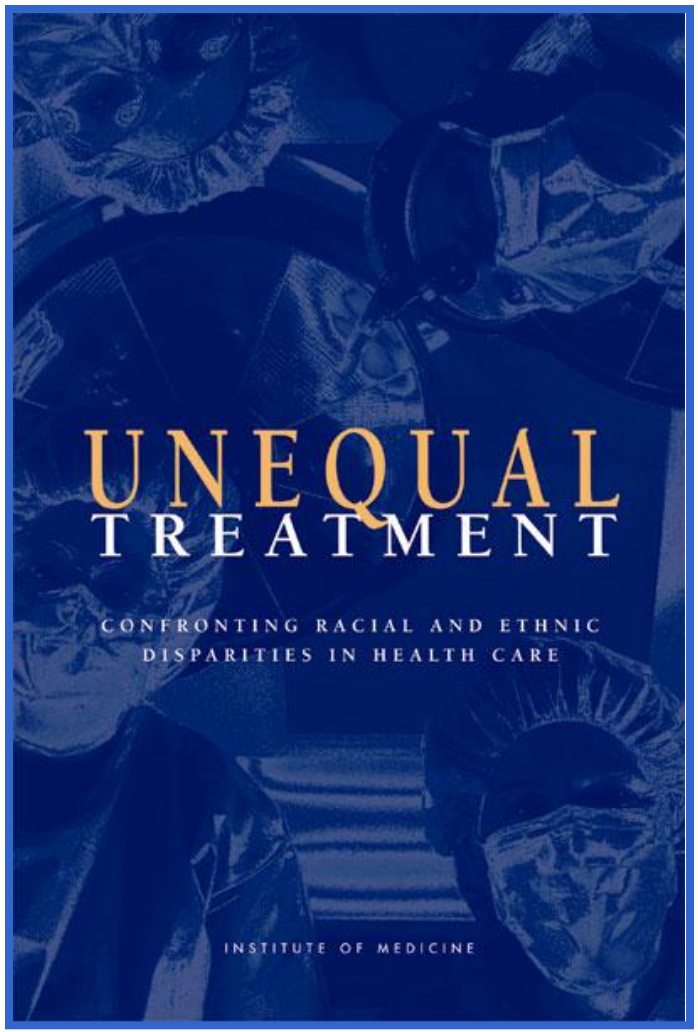
JOHNS HOPKINS UNIVERSITY | School of Nursing Center of Excellence for Cardiovascular Health
nursing.jhu.edu/cardiocenter

DC-Baltimore Research Center on Child Health Disparities

Presentation Objectives

- Provide context for the uniqueness of children in considering health disparities
- Define the differences in child versus adult health, the 5 D's
- Discuss research efforts to address child health disparities

Institute of Medicine Report



- 2003 Evidence-based review by panel of experts
- Offered broad range of recommendations
- ***Only 5 out of 103 studies addressed child health***

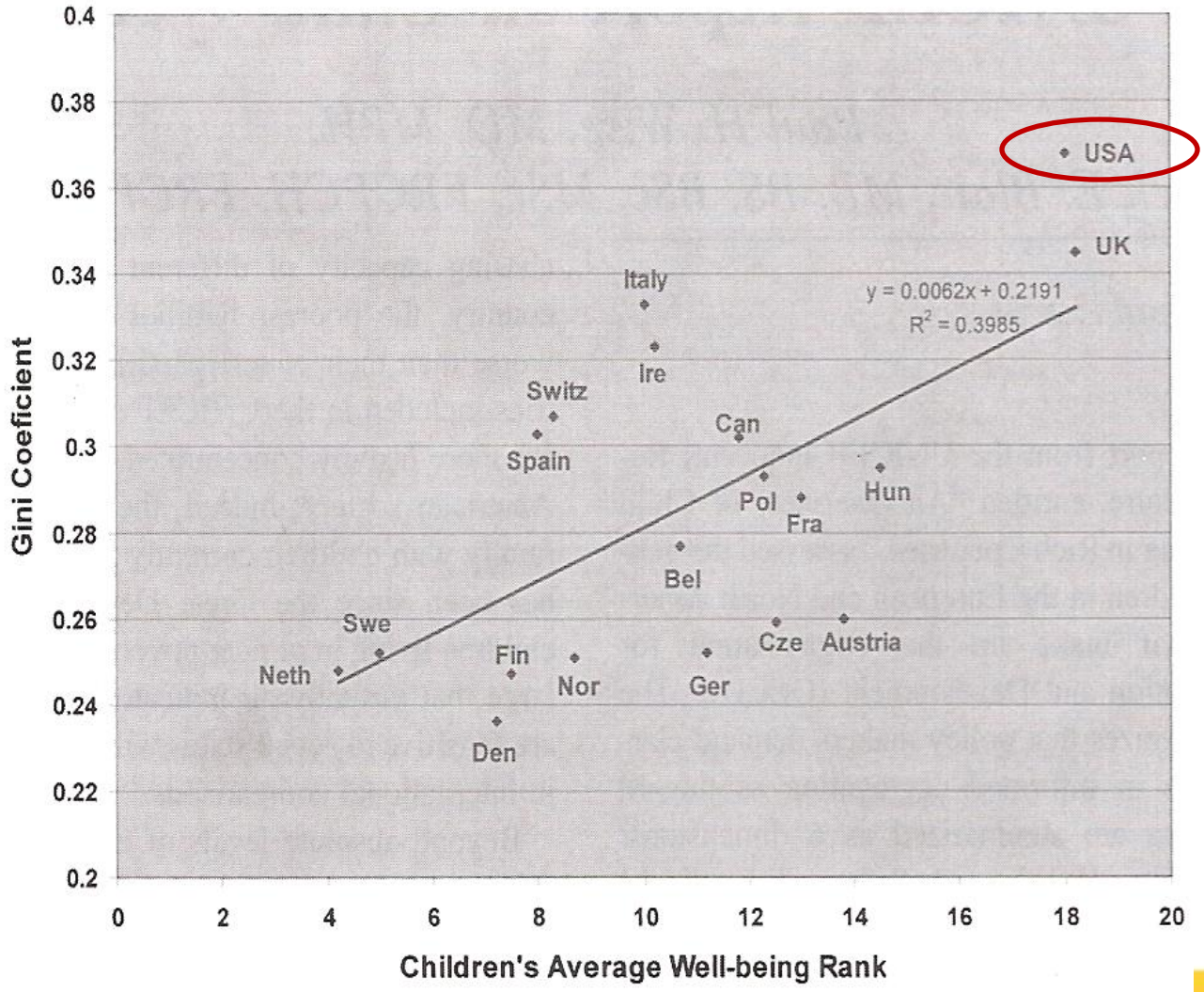
Needed Change: 2007 UNICEF Report

Dimensions of child well-being	Average ranking position (for all 6 dimensions)	Dimension 1 Material well-being	Dimension 2 Health and safety	Dimension 3 Educational well-being	Dimension 4 Family and peer relationships	Dimension 5 Behaviours and risks	Dimension 6 Subjective well-being
Netherlands	4.2	10	2	6	3	3	1
Sweden	5.0	1	1	5	15	1	7
Denmark	7.2	4	4	8	9	6	12
Finland	7.5	3	3	4	17	7	11
Spain	8.0	12	6	15	8	5	2
Switzerland	8.3	5	9	14	4	12	6
Norway	8.7	2	8	11	10	13	8
Italy	10.0	14	5	20	1	10	10
Ireland	10.2	19	19	7	7	4	5
Belgium	10.7	7	16	1	5	19	16
Germany	11.2	13	11	10	13	11	9
Canada	11.8	6	13	2	18	17	15
Greece	11.8	15	18	16	11	8	3
Poland	12.3	21	15	3	14	2	19
Czech Republic	12.5	11	10	9	19	9	17
France	13.0	9	7	18	12	14	18
Portugal	13.7	16	14	21	2	15	14
Austria	13.8	8	20	19	16	16	4
Hungary	14.5	20	17	13	6	18	13
United States	18.0	17	21	12	20	20	–
United Kingdom	18.2	18	12	17	21	21	20

OECD countries with insufficient data to be included in the overview: Australia, Iceland, Japan, Luxembourg, Mexico, New Zealand, the Slovak Republic, South Korea, Turkey.

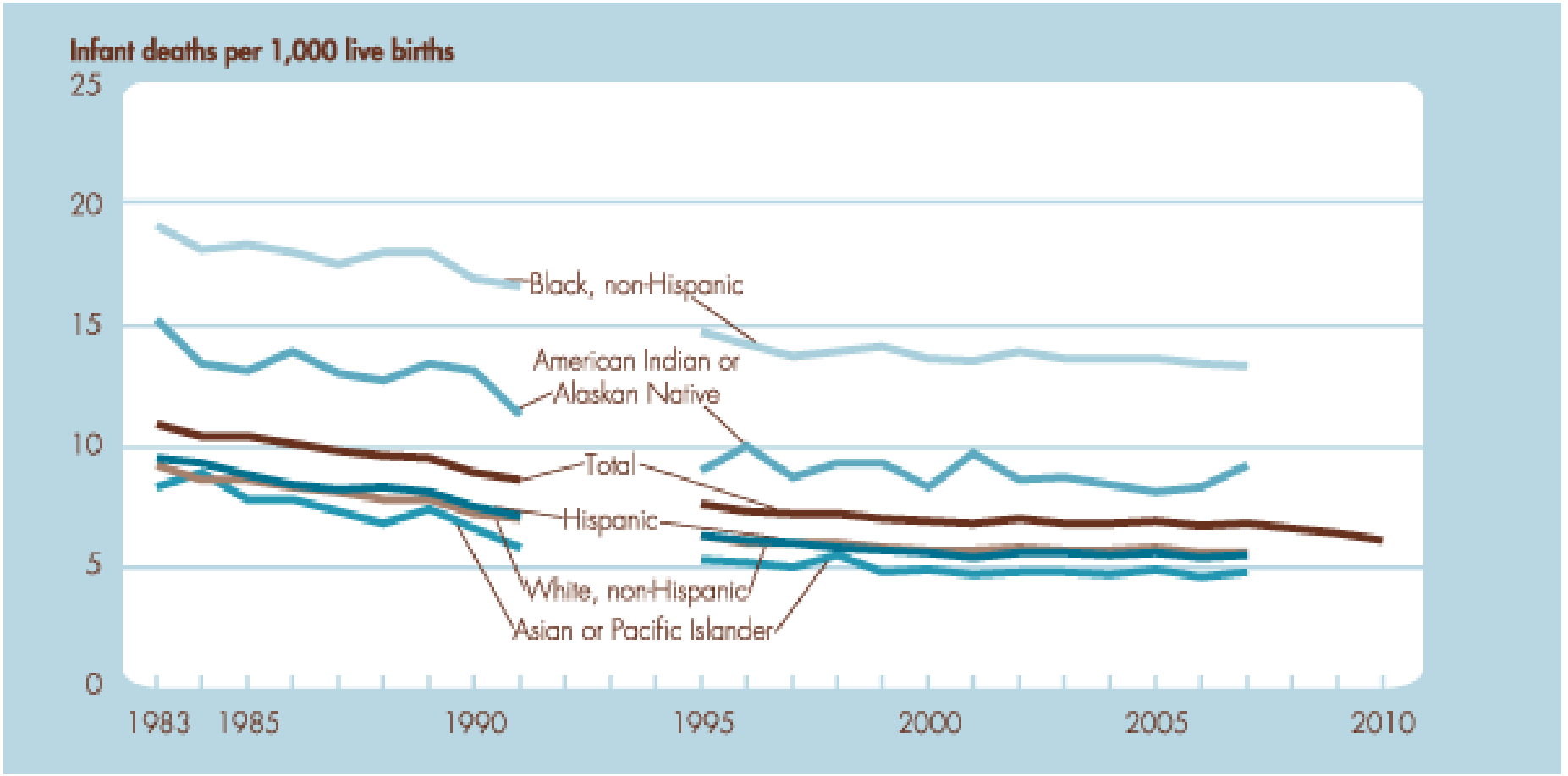
JOHNS HOPKINS MEDICINE

Child Well-being Rankings x Gini Coefficient



Wise PH, Blair ME. **Ambul Pediatr** 2007: 7:, 265-6

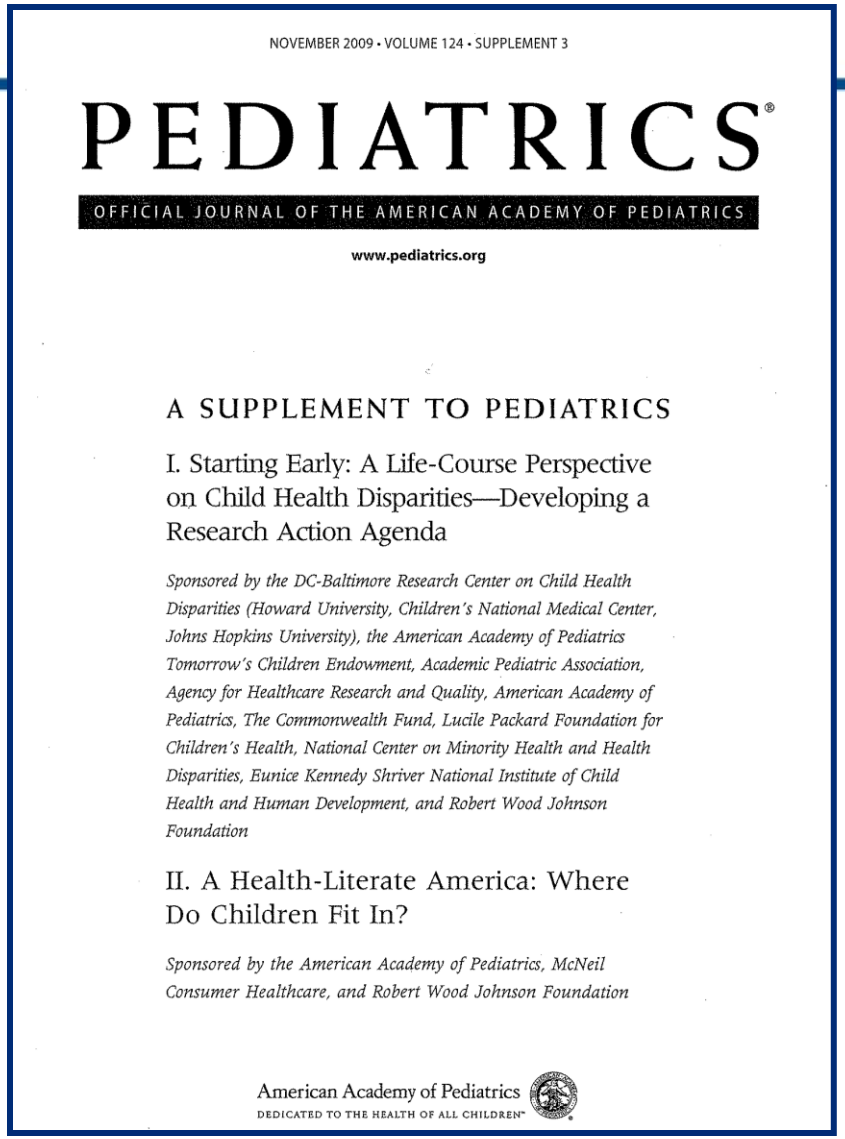
Infant Mortality



Federal Interagency Forum on Child and Family Statistics. *America's Children in Brief: Key National Indicators of Well-Being, 2012.* Washington, DC: U.S. Government Printing Office. www.childstats.gov

Child Health Disparities

Pediatrics. Nov 2009;124:S161-331



NOVEMBER 2009 • VOLUME 124 • SUPPLEMENT 3

PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

www.pediatrics.org

A SUPPLEMENT TO PEDIATRICS

I. Starting Early: A Life-Course Perspective on Child Health Disparities—Developing a Research Action Agenda

Sponsored by the DC-Baltimore Research Center on Child Health Disparities (Howard University, Children's National Medical Center, Johns Hopkins University), the American Academy of Pediatrics Tomorrow's Children Endowment, Academic Pediatric Association, Agency for Healthcare Research and Quality, American Academy of Pediatrics, The Commonwealth Fund, Lucile Packard Foundation for Children's Health, National Center on Minority Health and Health Disparities, Eunice Kennedy Shriver National Institute of Child Health and Human Development, and Robert Wood Johnson Foundation

II. A Health-Literate America: Where Do Children Fit In?

Sponsored by the American Academy of Pediatrics, McNeil Consumer Healthcare, and Robert Wood Johnson Foundation

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

- Invitational conference 2008 developed a research action agenda
- Need for research on biologic, environmental and psychosocial factors
- Need for study of measures
- Need for intervention

Who Has the Health Disparity?

JOHNS HOPKINS MEDICINE

- "Health disparities should be defined, investigated, and ameliorated based on **race and ethnicity, socioeconomic status, generation, and geography**, as well as their complex interactions."

What is a "Disparity"?

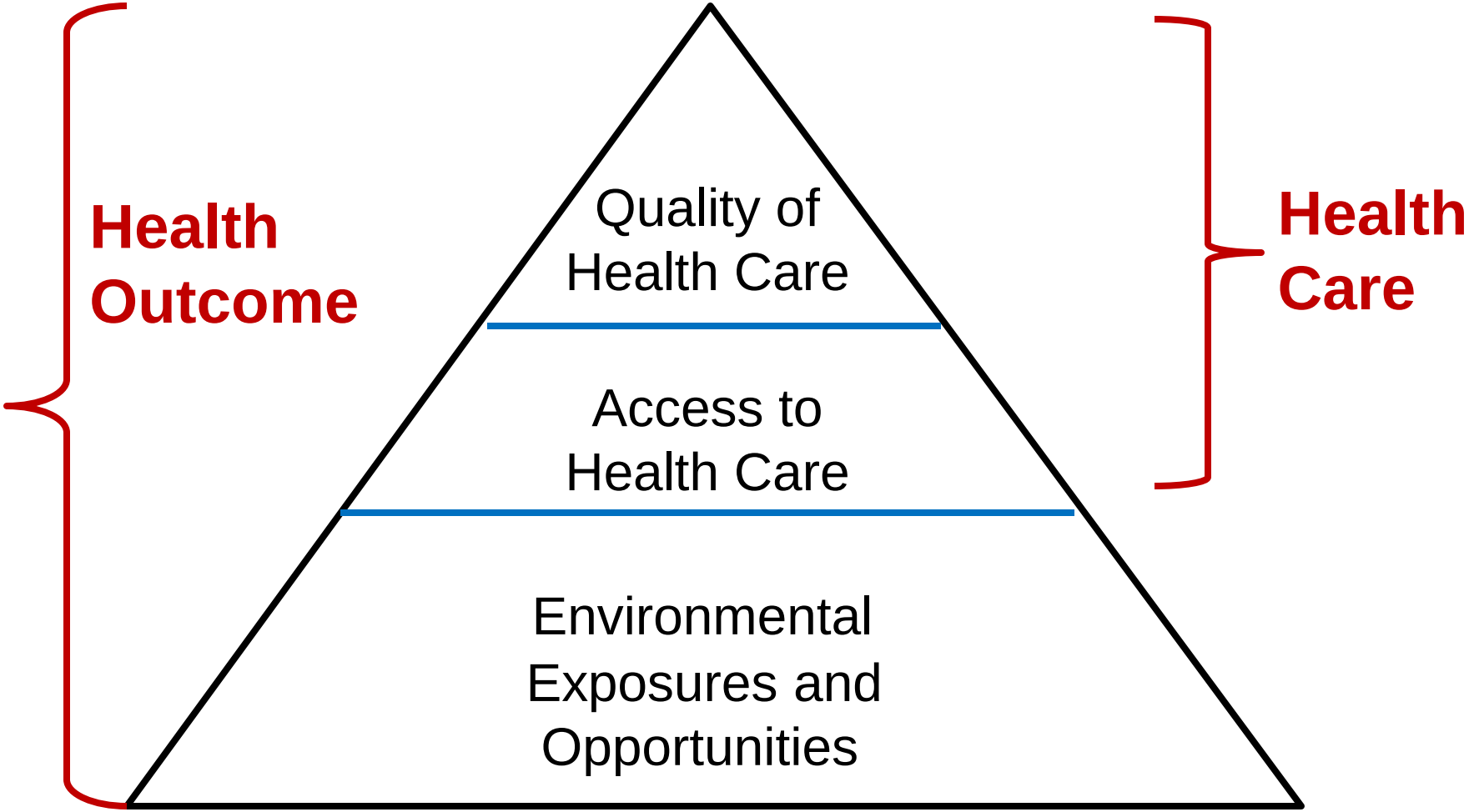
- "Disparities should be defined not simply as a difference but as an inequitable difference that is potentially systematic and avoidable."

What Disparity?

JOHNS HOPKINS MEDICINE

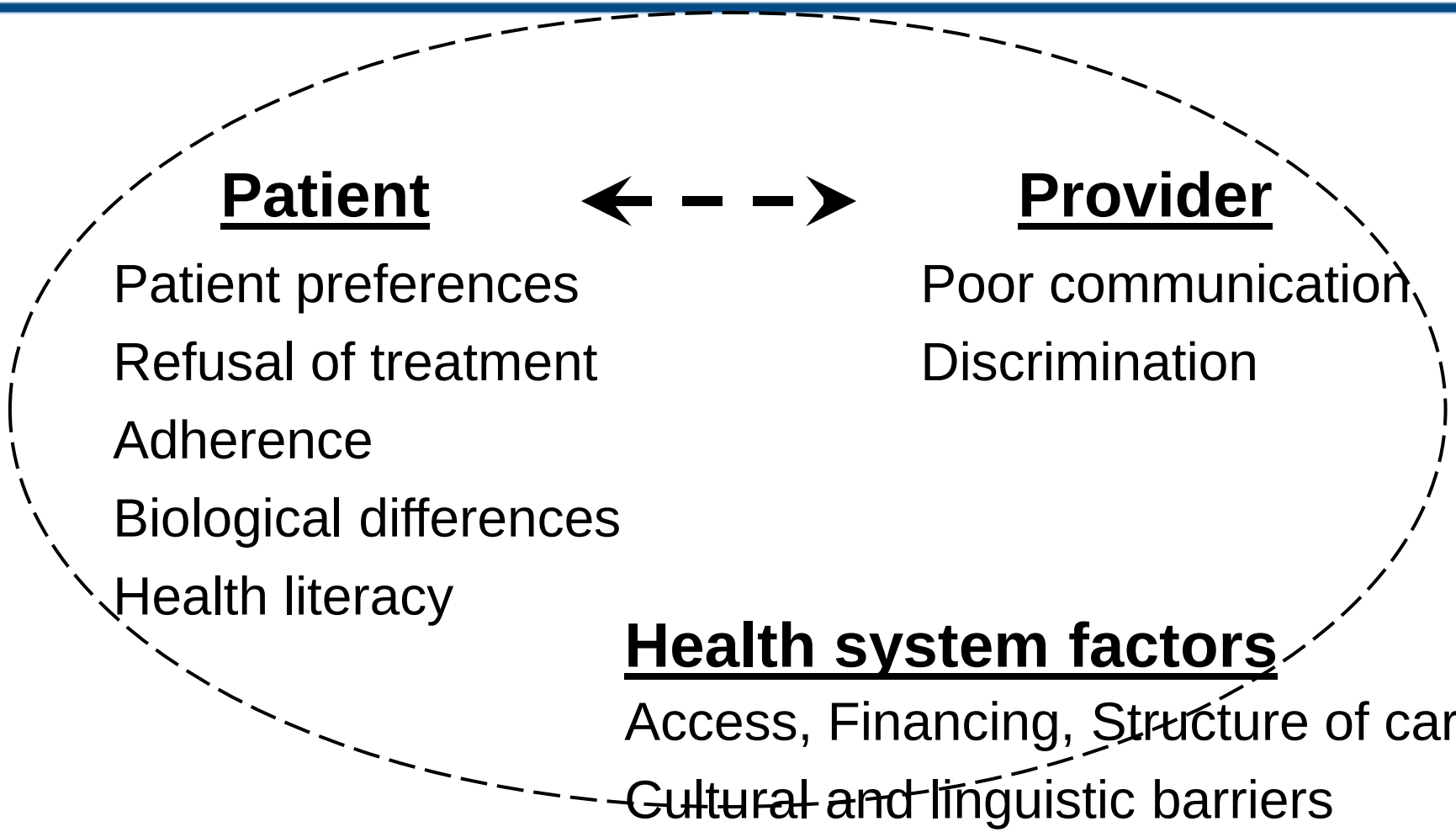
- Health outcome
- Health care
- “Health disparities research should involve consideration of life chances, opportunity and risk, and quality of life in a way that includes psychosocial and socioeconomic perspectives, as well as more traditional attention to health status and the provision of health care.”

Levels at Which Disparities are Produced



Jones Camara P. **Phylon** 2002;50:7-22

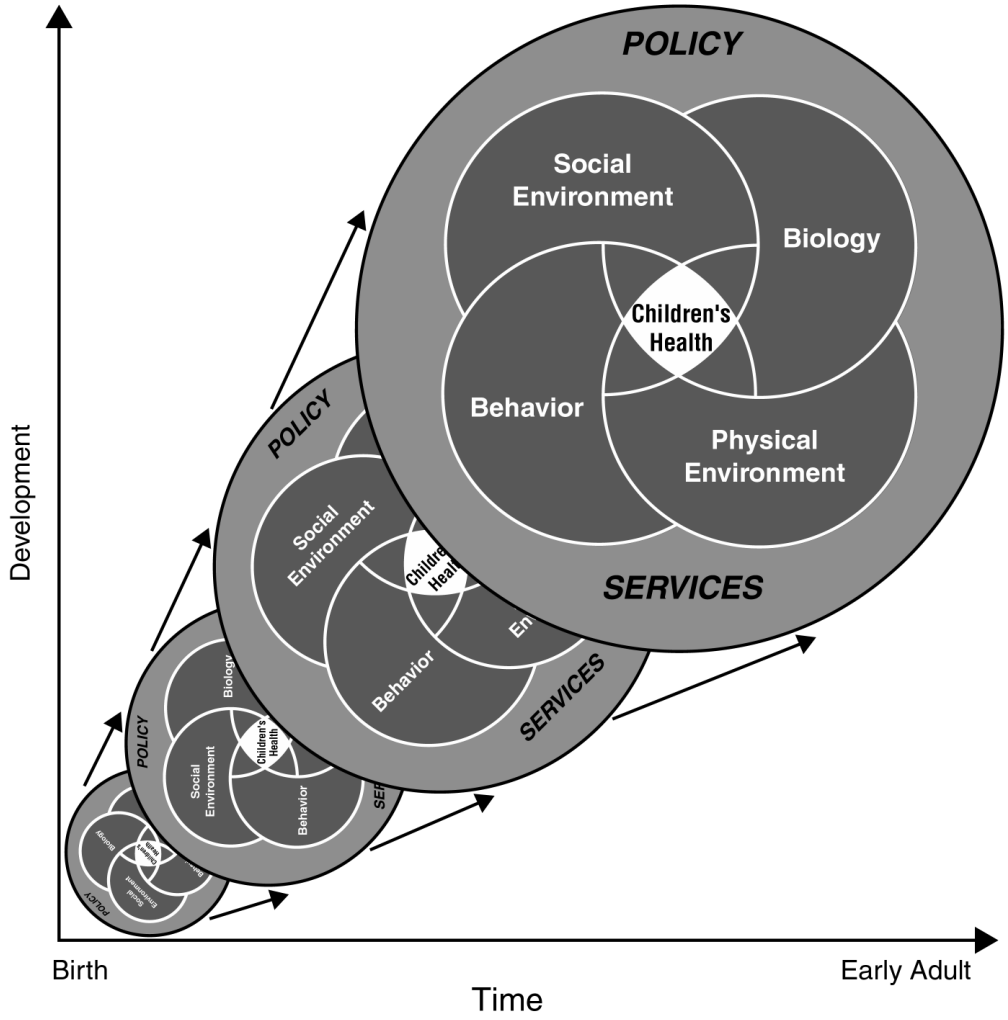
Potential Sources of Disparities in Health Care



When or Where Did the Disparity Occur?

JOHNS HOPKINS MEDICINE

NRC IOM Model of Children's Health and Its Influences



Children's Health, the Nation's Wealth. DC: National Academies Press, 2004.

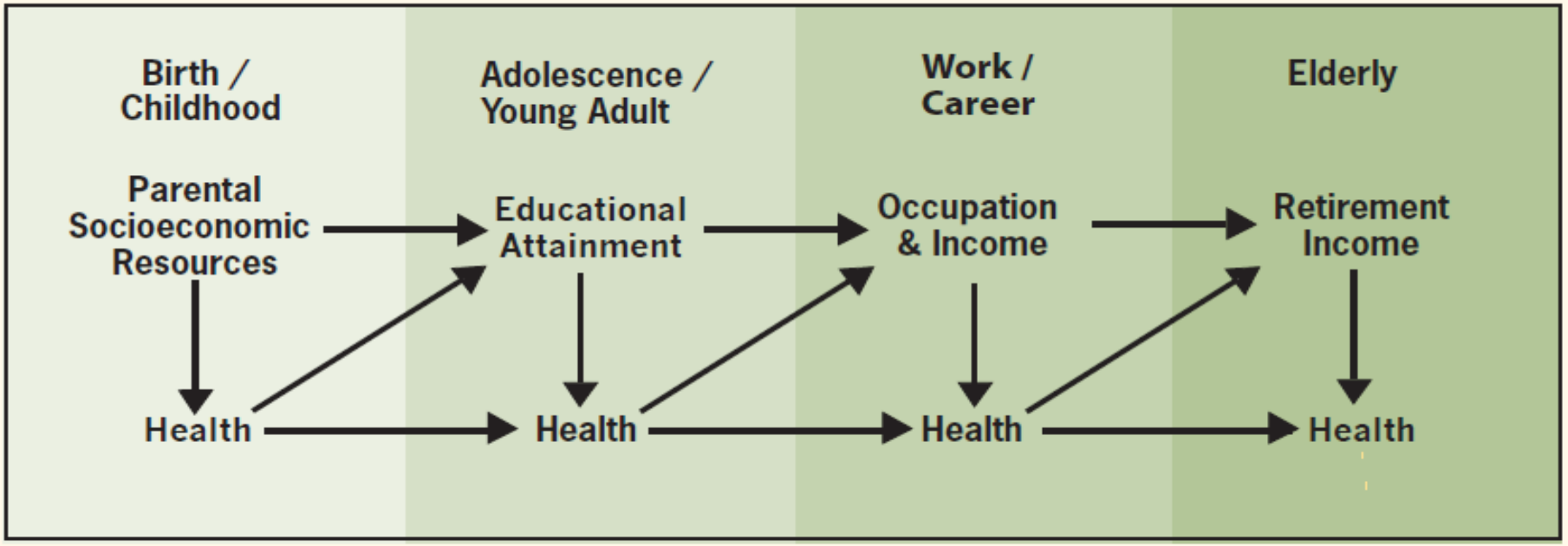
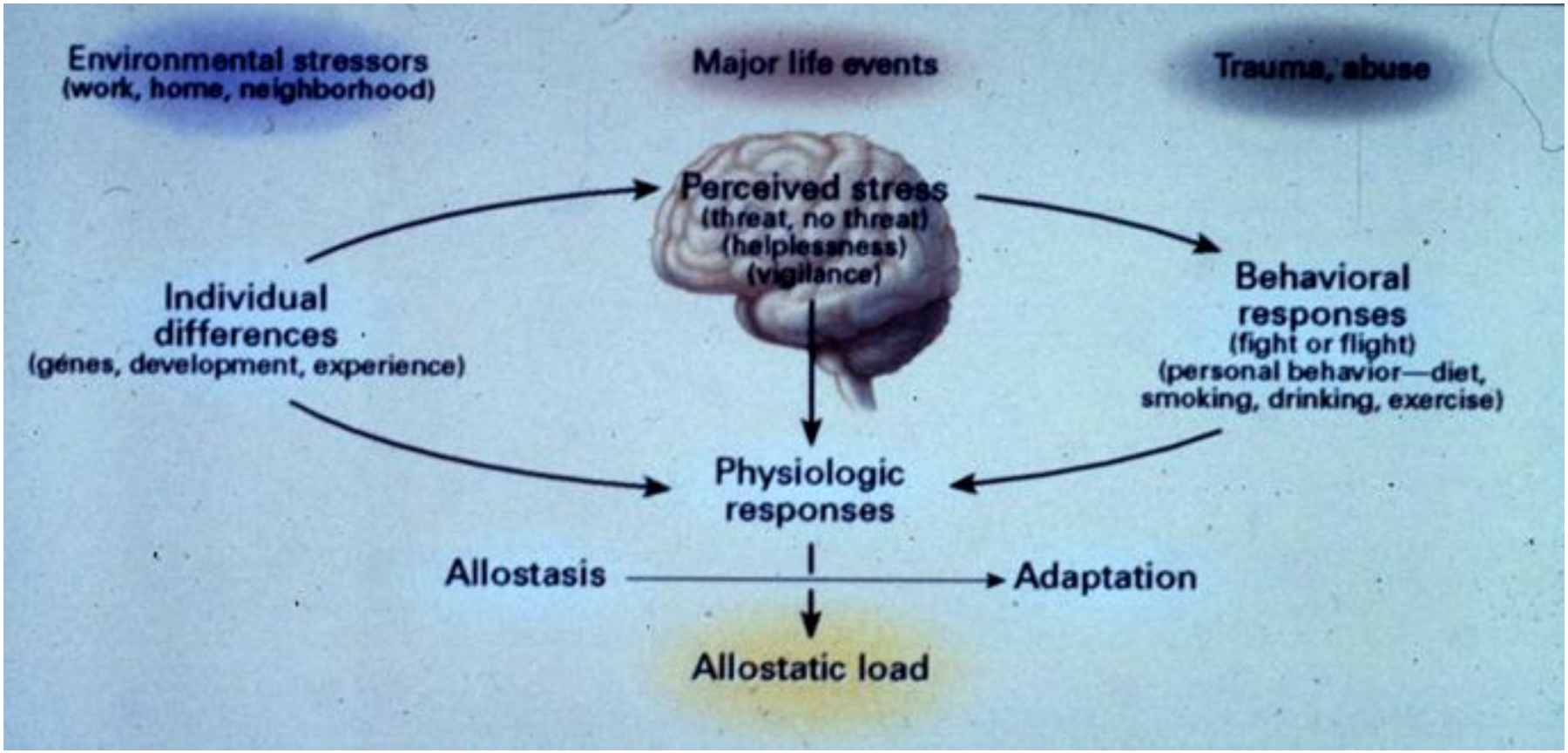


Figure 2. The Dynamic Relationship Between Health and Ladder Position.

Reaching for a Healthier Life: Facts on SES and Health in the U.S. http://www.macses.ucsf.edu/downloads/Reaching_for_a_Healthier_Life.pdf

How did the Disparity Occur?

JOHNS HOPKINS MEDICINE



McEwen B. NEJM. 1998

The Evolution of Health Disparities Research

- 1st Era: Poverty as Threshold
- 2nd Era: Gradients
- 3rd Era: Mechanisms
- 4th Era: Multiple Levels of Influence
- 5th Era: Interactions, Systems, Causality
- 6th Era: ?? Intervention and Translation to Programs & Policy

Adler & Stewart. Ann NY Acad Sci 2010;1186:5-23

Issues Unique to Children: The FIVE "D's"

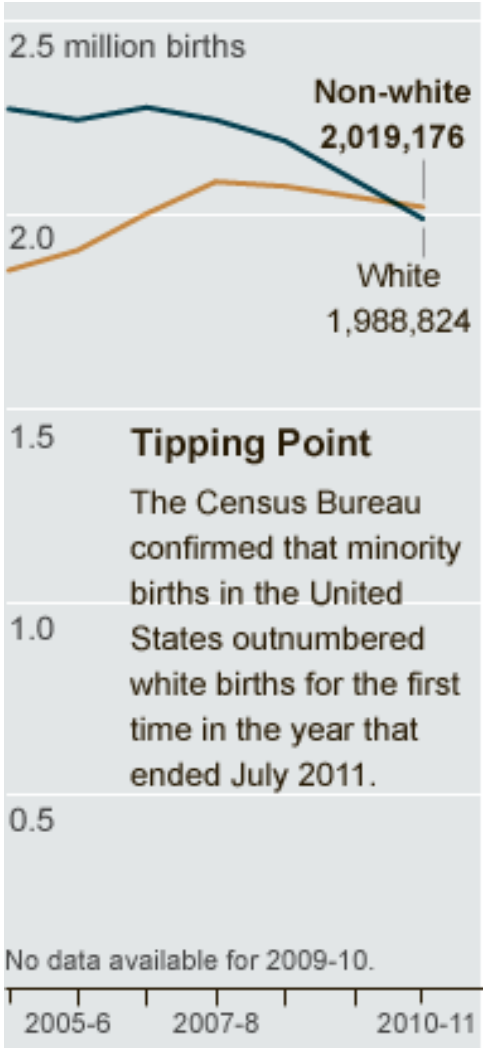
- Demographic Patterns
- Developmental Change
- Dependency
- Differential Epidemiology
- Dollars/ Financing

Stille C et al. **Academic Pediatr** 2010;10(4):211-7.

Issues Unique to Children: D1. Demographic Patterns

Adults	Children/ Adolescents
•Poverty reduced in part because of Medicare	•Disproportionate high rates of poverty
	•Disproportionate racial and ethnic diversity

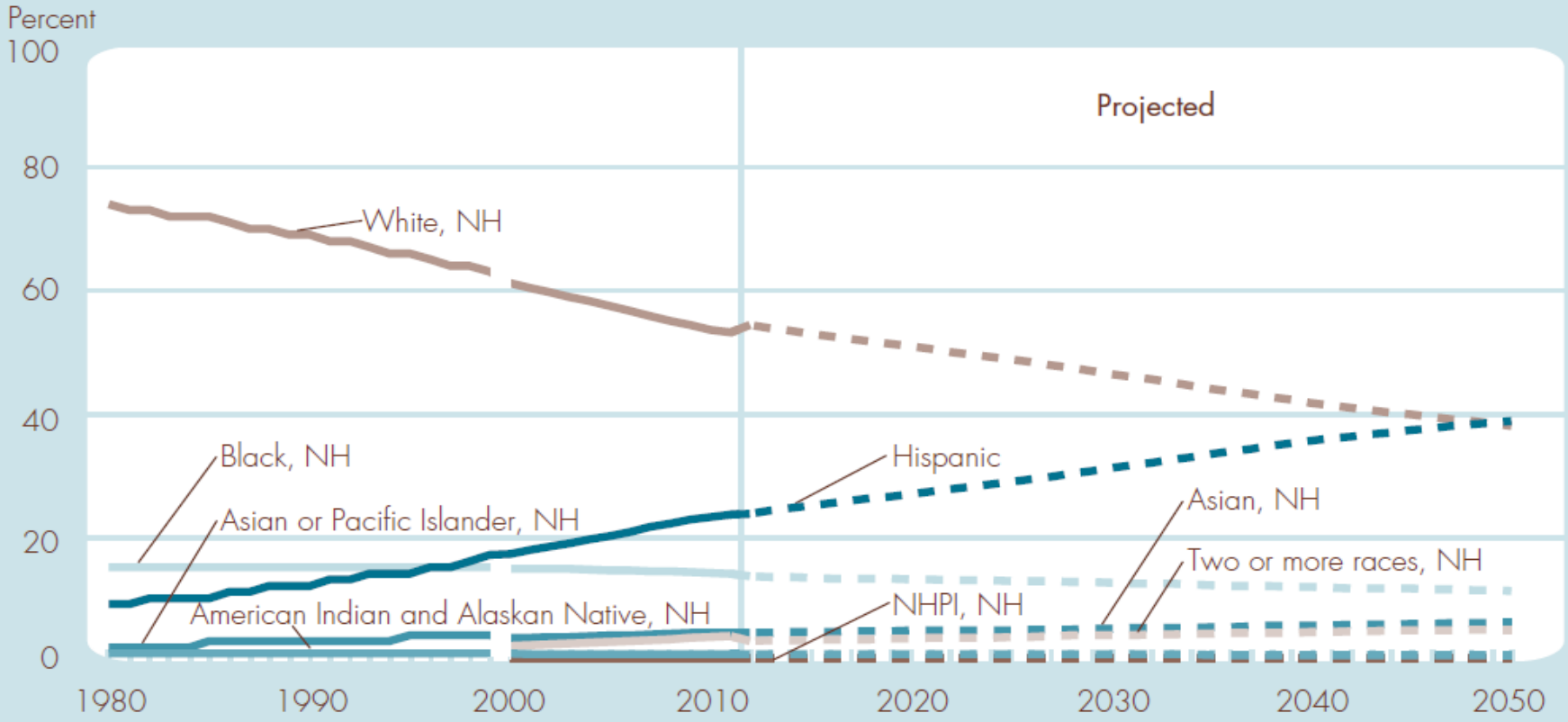
US Census Bureau "Tipping Point"



US Census Bureau http://www.census.gov/newsroom/releases/archives/population/cb12-90.html, New York Times graphic, May 17, 2012


NON-WHITE BABIES NOW OUTNUMBER WHITE BABIES IN AMERICA FOR THE FIRST TIME.
SECOND.
BARS

Figure 1 Percentage of children ages 0–17 in the United States by race and Hispanic origin, 1980–2011 and projected 2012–2050

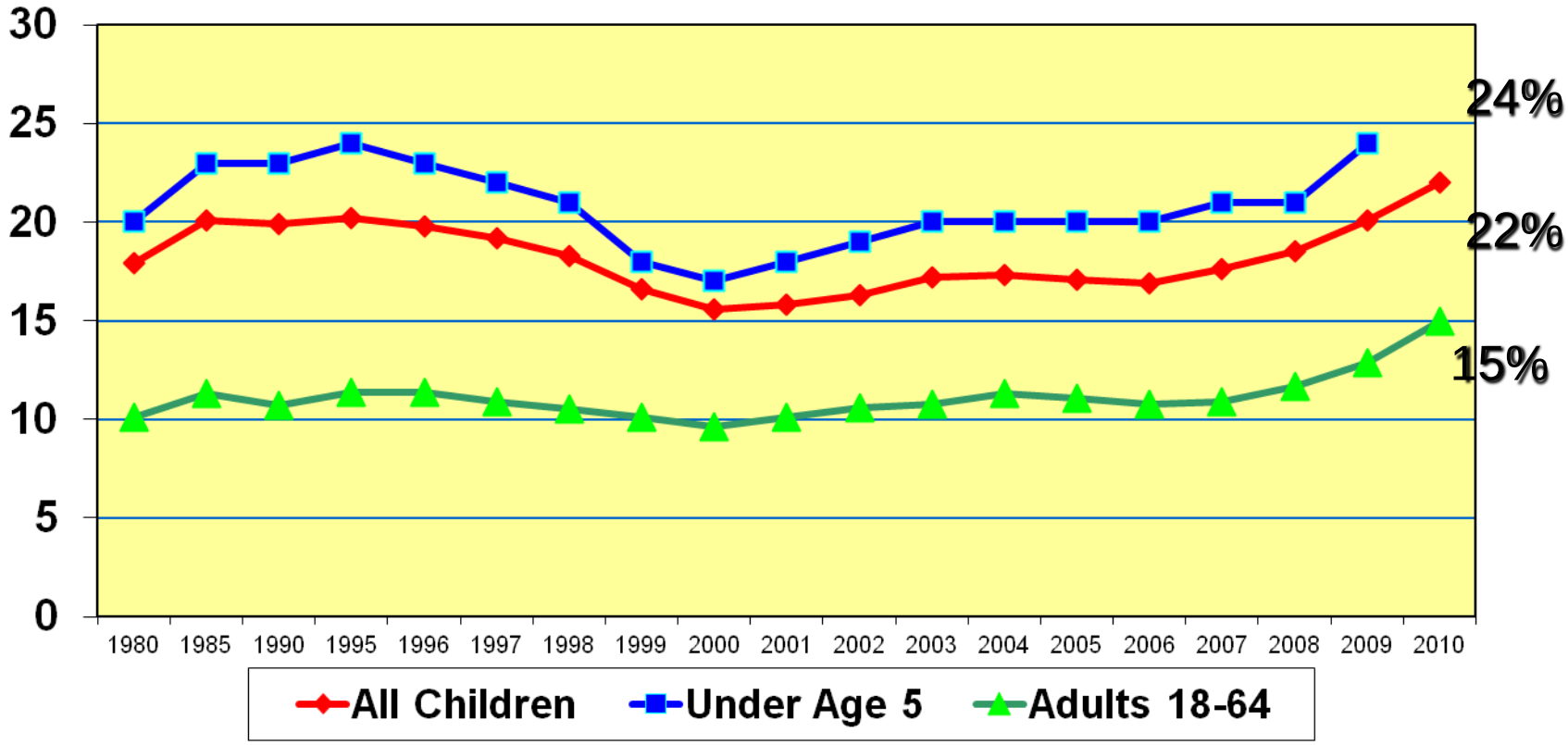


NOTE: The acronym NH refers to non-Hispanic origin. The acronym NHPI refers to the Native Hawaiian and Other Pacific Islander population. Each group represents the non-Hispanic population, with the exception of the Hispanic category itself. Race data from 2000 onward are not directly comparable with data from earlier years. Data on race and Hispanic origin are collected separately. Persons of Hispanic origin may be of any race. Population projections are based on Census 2000 and may not be consistent with the 2010 Census results.

SOURCE: U.S. Census Bureau, Population Estimates and Projections.

Federal Interagency Forum on Child and Family Statistics. *America's Children in Brief: Key National Indicators of Well-Being, 2012.* Washington, DC: U.S. Government Printing Office. www.childstats.gov

U.S. Poverty Status by Age Group, 1980-2009



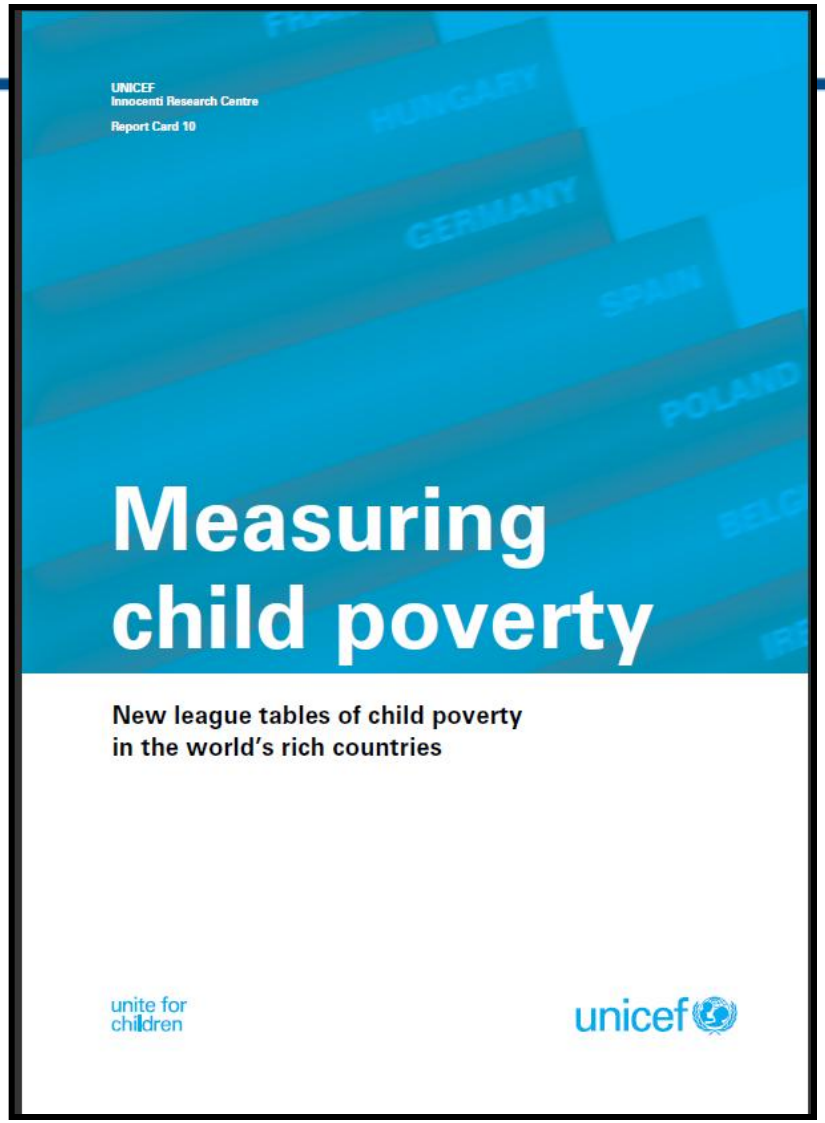
Poverty Level in 2010:
$22,000 family of 4

Current Population Survey, U.S. Census

JOHNS HOPKINS MEDICINE

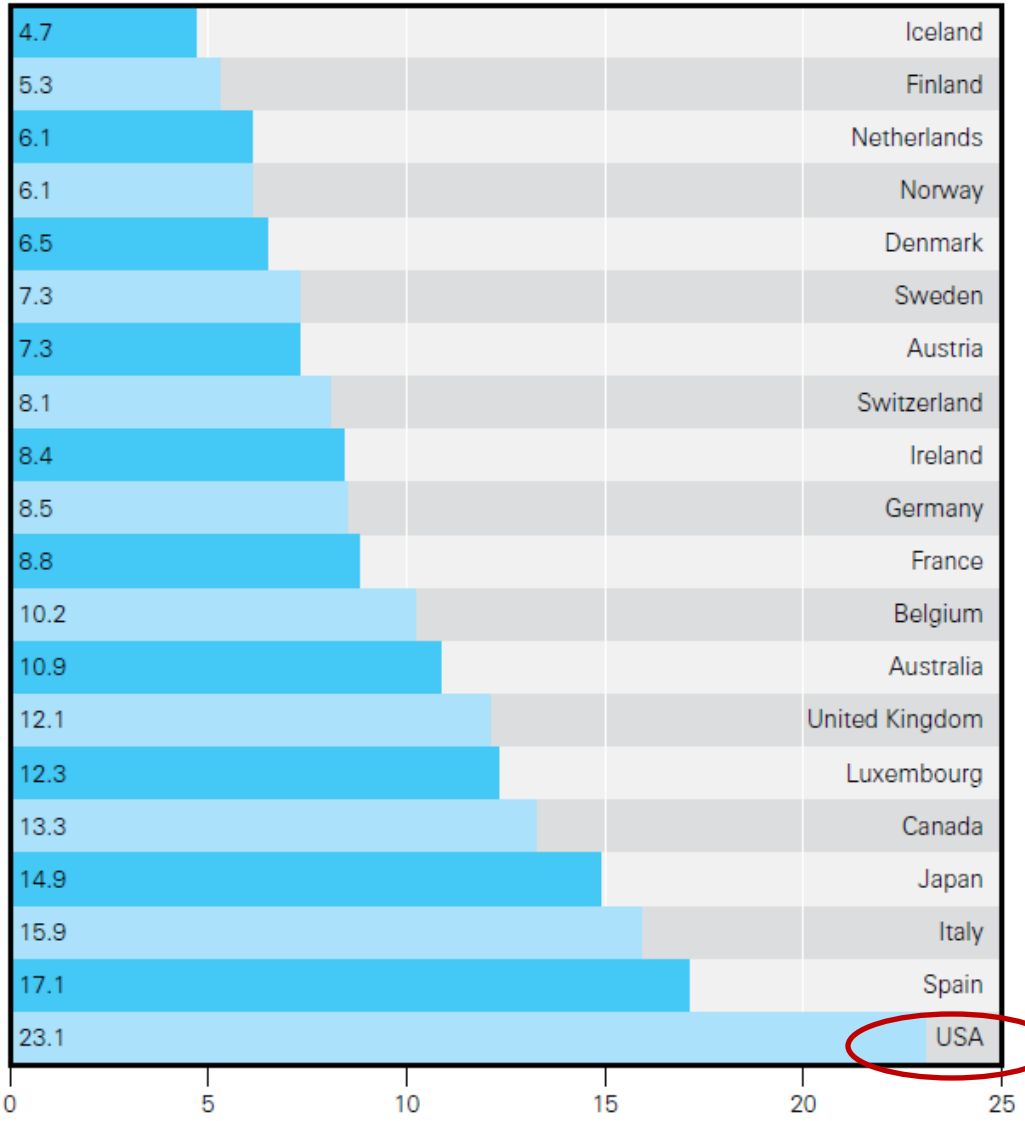
Kids Count 2012

2012 UNICEF Report



http://www.unicef-irc.org/publications/pdf/rc10_eng.pdf

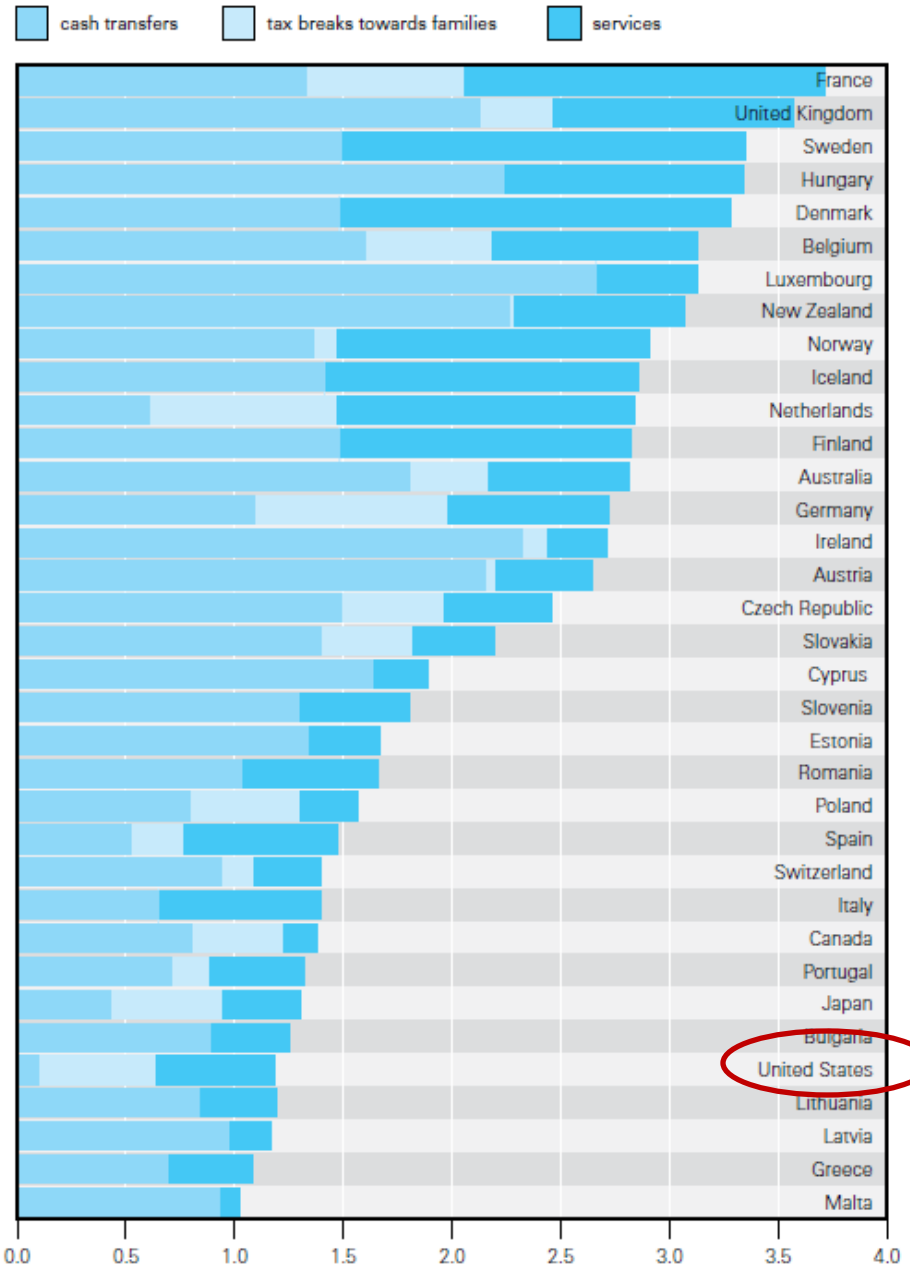
Fig. 4 A league table of relative child poverty, selected OECD countries



Note: Data refer to children aged 0 to 17.
Sources: Calculations based on EU-SILC 2009, HILDA 2009, SLID 2009, SHP 2009, PSID 2007. Results for Japan are from Cabinet Office, Gender Equality Bureau (2011).

The US had the highest poverty rate compared to other developed countries.

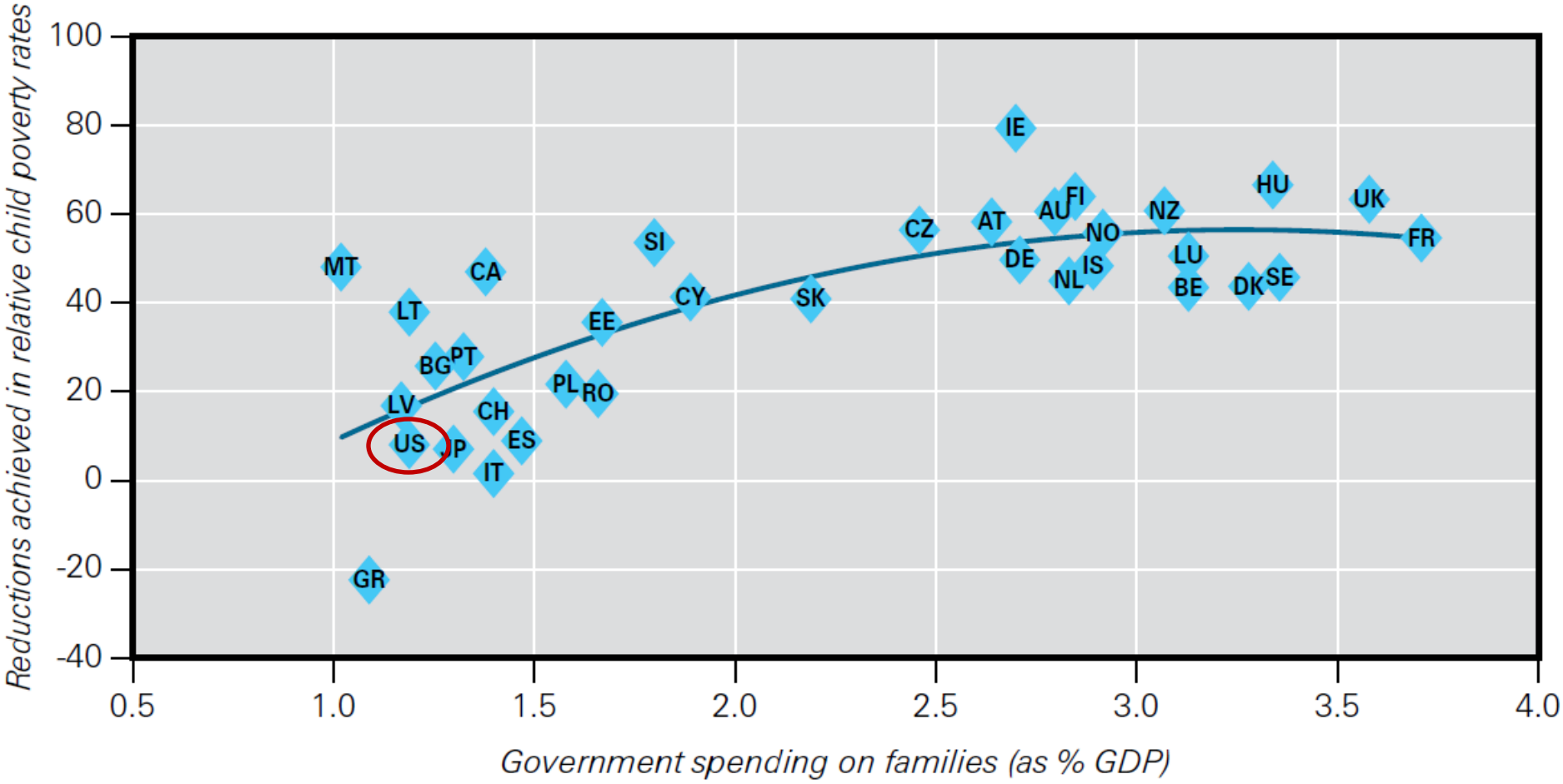
Fig. 11 Spending on families and children



Public spending on families in cash transfers, tax breaks and services (as % GDP)

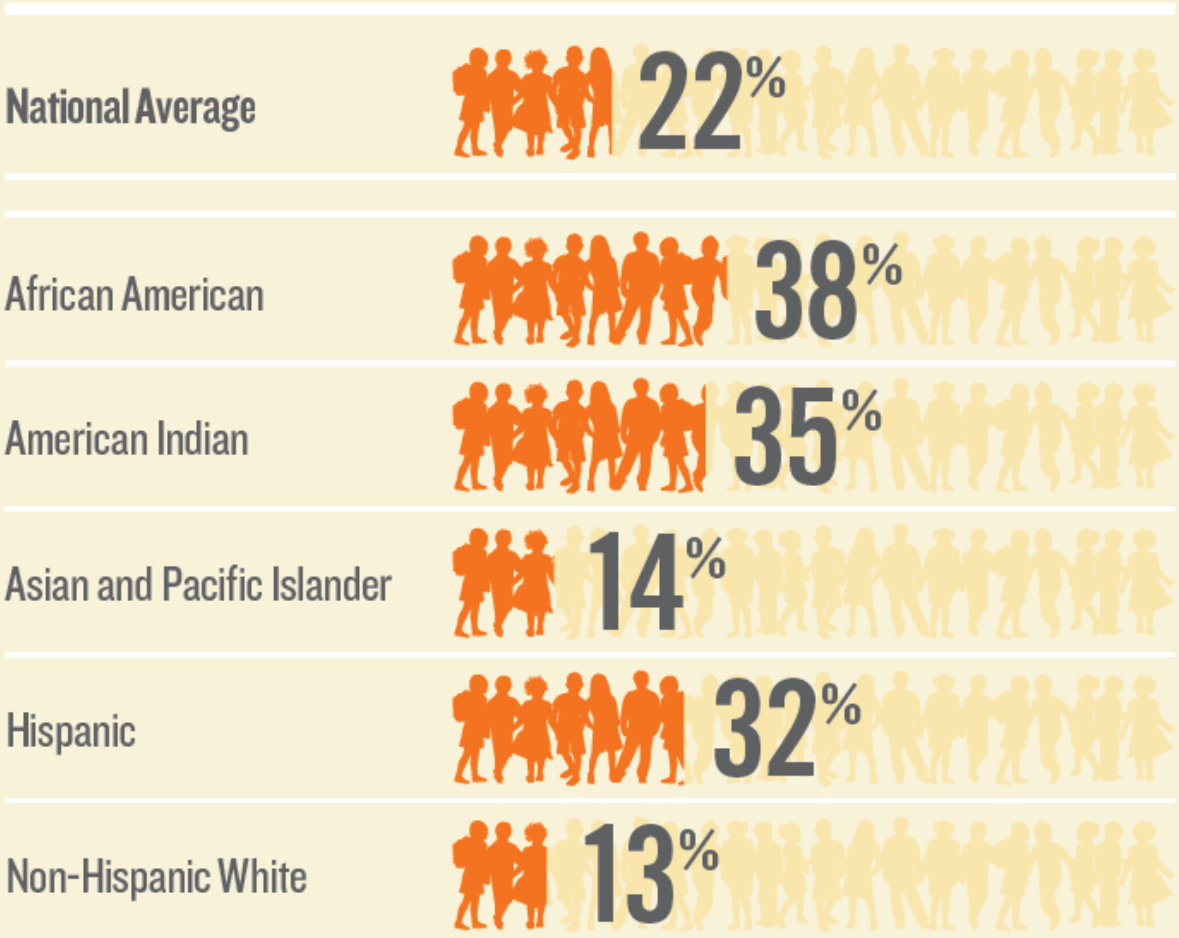
Source: Data for public spending are from the OECD Family Database, around 2007.

Fig. 11a Government spending on families and children compared to reductions achieved in relative child poverty due to taxes and transfers



JOHNS HOPKINS MEDICINE

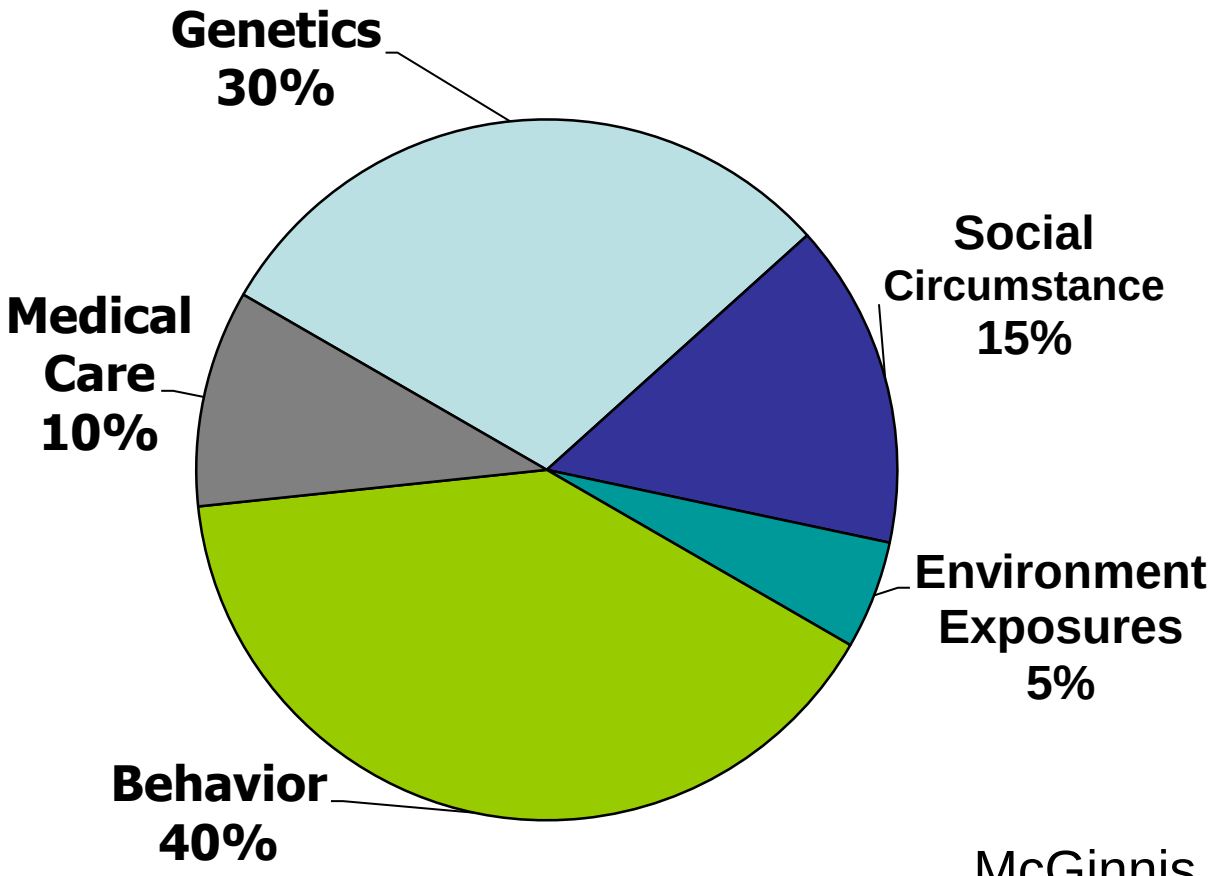
Children in Poverty by Race and Hispanic Origin: 2010



SOURCE U.S. Census Bureau, 2010 American Community Survey.

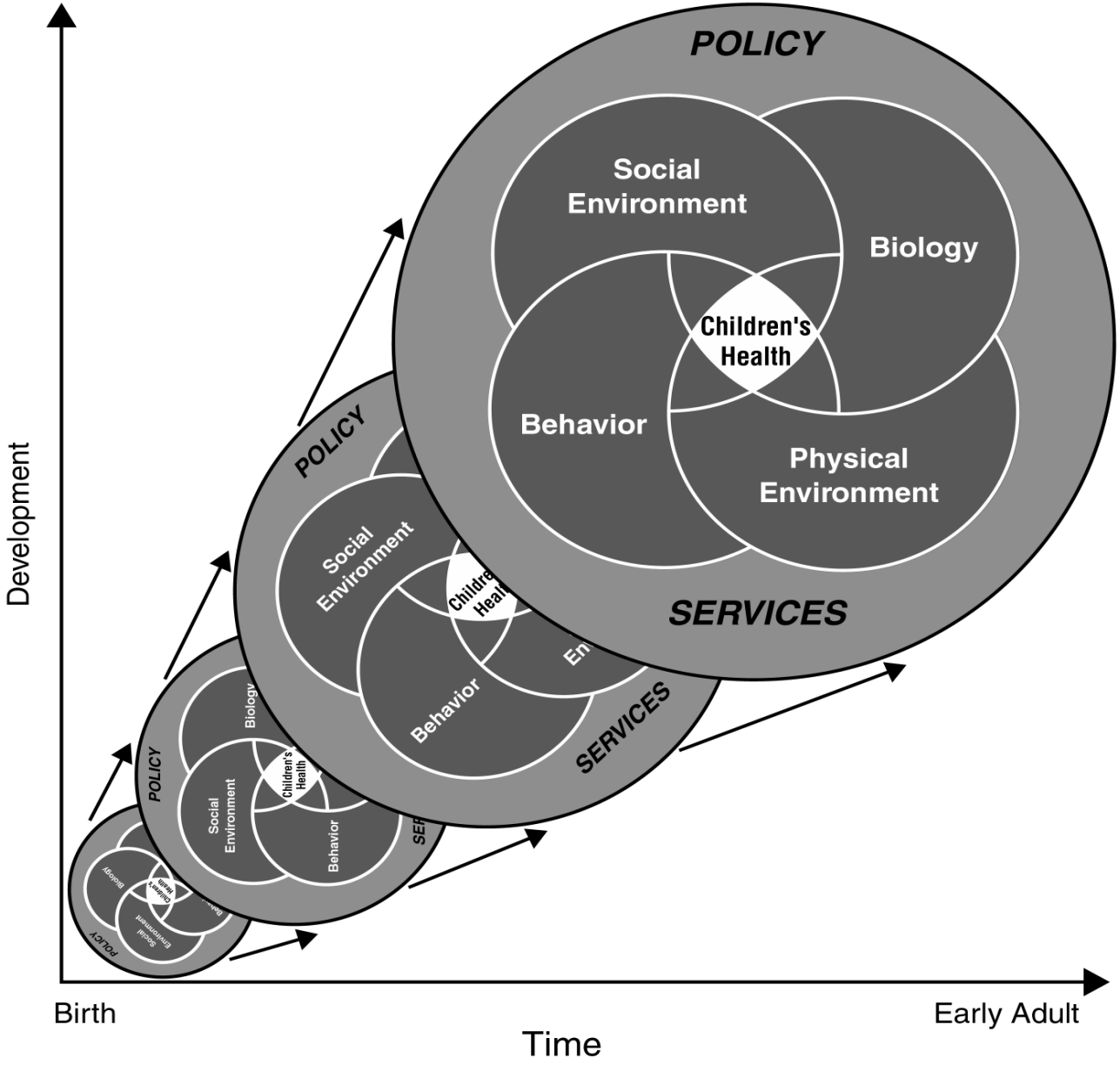
Kids Count 2012

Determinants of Health: Early Deaths



McGinnis et al, **Health Affairs** 2002;21:78-93

A Model of Children's Health & Influences



National Research Council/IOM Committee on Evaluation of Children's Health. **Children's Health, the Nation's Wealth**. DC: National Academies Press, 2004.

Selected studies linking childhood SES to chronic disease in adulthood

Author	Year	Journal	Outcome
Maty, S.C. et al.	2008	American Journal of Public Health	Type 2 diabetes
Lidfeldt, J. et al.	2007	American Journal of Epidemiology	Type 2 diabetes
James, S.A. et al.	2006	American Journal of Public Health	Obesity
Lawlor, D.A. et al.	2006	American Journal of Epidemiology	Mortality from cardiovascular disease, diabetes, respiratory disease, smoking-related cancers, and stomach cancer
Claussen, B. et al.	2003	Journal of Epidemiology and Community Health	Cardiovascular disease mortality
Langenberg, C. et al.	2003	Journal of Epidemiology and Community Health	Obesity
Poulton, R. et al.	2002	Lancet	Cardiovascular and dental health at age 26
Frankel, S. et al.	1999	American Journal of Epidemiology	Stroke mortality
Gliksman, M.D. et al.	1995	Journal of Epidemiology and Community Health	Coronary heart disease

Selected studies linking low birth weight to chronic disease in adulthood

Author	Year	Journal	Outcome
Al Salmi, I. et al.	2008	Diabetes Care	Impaired glucose tolerance and Type 2 diabetes
Li, S. et al.	2008	Kidney International	Chronic kidney disease
Kajantie, E. et al.	2006	Journal of Clinical endocrinology and Metabolism	Spontaneous hypothyroidism
Kajantie et al.	2005	International Journal of Epidemiology	Cardiovascular and all-cause mortality
Rich-Edwards, J. et al.	2005	British Medical Journal	Coronary heart disease
Barker, D.J. et al.	2002	Journal of Hypertension	Hypertension
Eriksson, J. et al.	2000	Hypertension	Hypertension
Forsen, T. et al.	2000	Annals of Internal Medicine	Type 2 diabetes
Frankel, S. et al.	1996	Lancet	Coronary heart disease

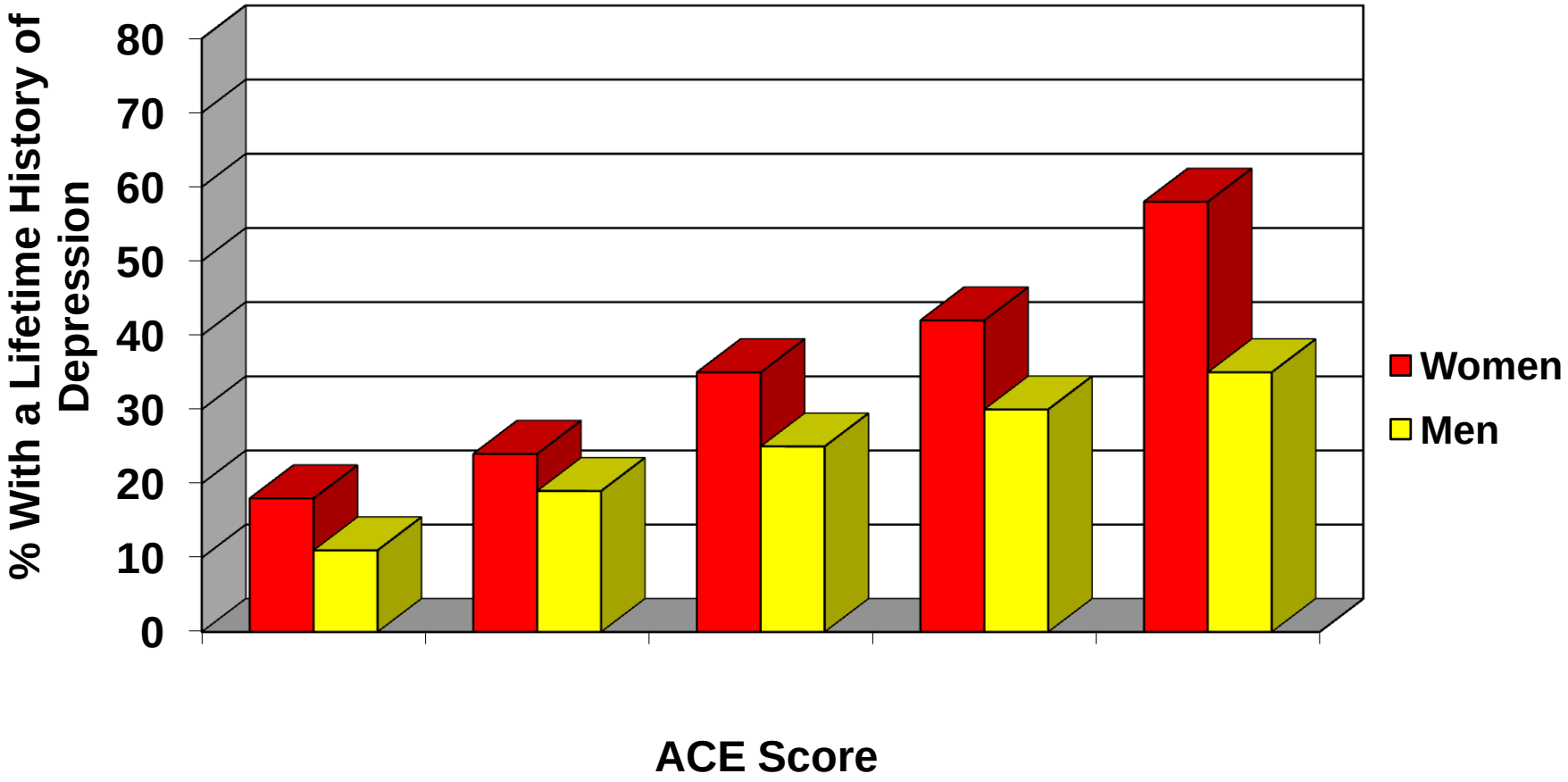
Braveman P

Adverse Childhood Experience
ACE Study: CDC and Kaiser Permanente

- Examined the link between childhood stressors and adult health
- N=17,000 surveyed on past history of abuse, neglect, family dysfunction and current behavior and health
- As the number of ACE increases, the risk for poor health outcomes increase: substance use, COPD, depression, fetal death, heart disease, liver disease, IPV, STIs, suicide attempts, unintended pregnancies

Middlebrooks & Audage, CDC 2008

Childhood Experiences Underlie Chronic Depression



http://www.cdc.gov/ace/about.htm

JOHNS HOPKINS MEDICINE

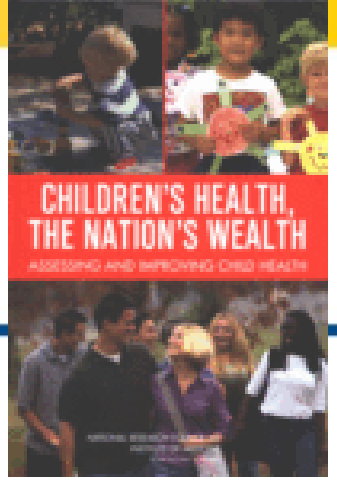
D1. Demographic Patterns: Implications

- Substantial investment is needed to understand and address social influences on child and adolescent health
- Evidence-based interventions with high risk or disadvantaged families (e.g. home visiting and Head Start) must be supported
- Addressing racial/ethnic and socioeconomic disparities must be a priority in child health with implications for adult health

Issues Unique to Children: D2. Developmental Change

Adults	Children/ Adolescents
•Health maintenance •Prevention of bad sequelae	•Enhance developmental progress
•Rehabilitative	•Habilitative

National Research Council & IOM Definition of Child Health

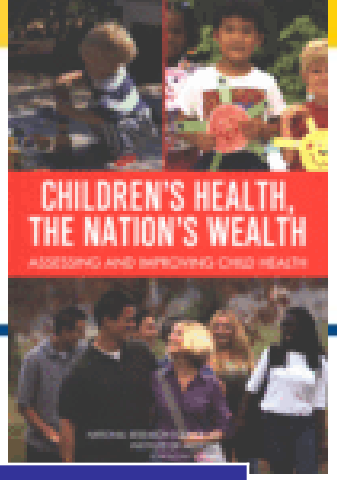


"...the extent to which individual children or groups of children are able or enabled to

a) develop and realize their potential,
b) satisfy their needs, and
c) develop the capacities that allow them to interact successfully with their biological, physical, and social environments."

IOM & National Research Council
Children's Health, The Nation's Wealth, 2004

Natl Research Council/IOM Domains of Child Health



Health Conditions	Functioning	Health Potential
• Alterations in health status due to disease, disability or injury • Symptoms	• Physical, cognitive, emotional, and social functioning and deficits • Functional deficit, disability • Restriction in activity	• Competency and capacity in physical, cognitive, emotional, social well-being and developmental potential • Resilience

D2. Developmental Change: Implications

- To address disparities must focus on maximizing potential and independence rather than regaining lost skills
- Evaluation of the care models for children must include functional and developmental outcomes
- Special issues of adolescents and their transition to adulthood must be addressed

Issues Unique to Children: D3. Dependency

Adults	Children/ Adolescents
•Independent and autonomous	•Dependency on adults •Parents are essential partners
	•Team members: Family, child care providers, teachers, others

D3. Dependency: Implications

- To address disparities community collaboration is necessary and must include child care, schools and families as key partners
- Services, supports, and evaluation must include the health functioning of families, recognizing that most children have little autonomy in health care

Issues Unique to Children: D4. Differential Epidemiology

Adults	Children/ Adolescents
•Large number of common chronic conditions	•Predominantly healthy •Relatively rare conditions
•Care delivery: Subspecialists in the community	•Care delivery: Subspecialists based in academic health centers

D4. Differential Epidemiology: Implications

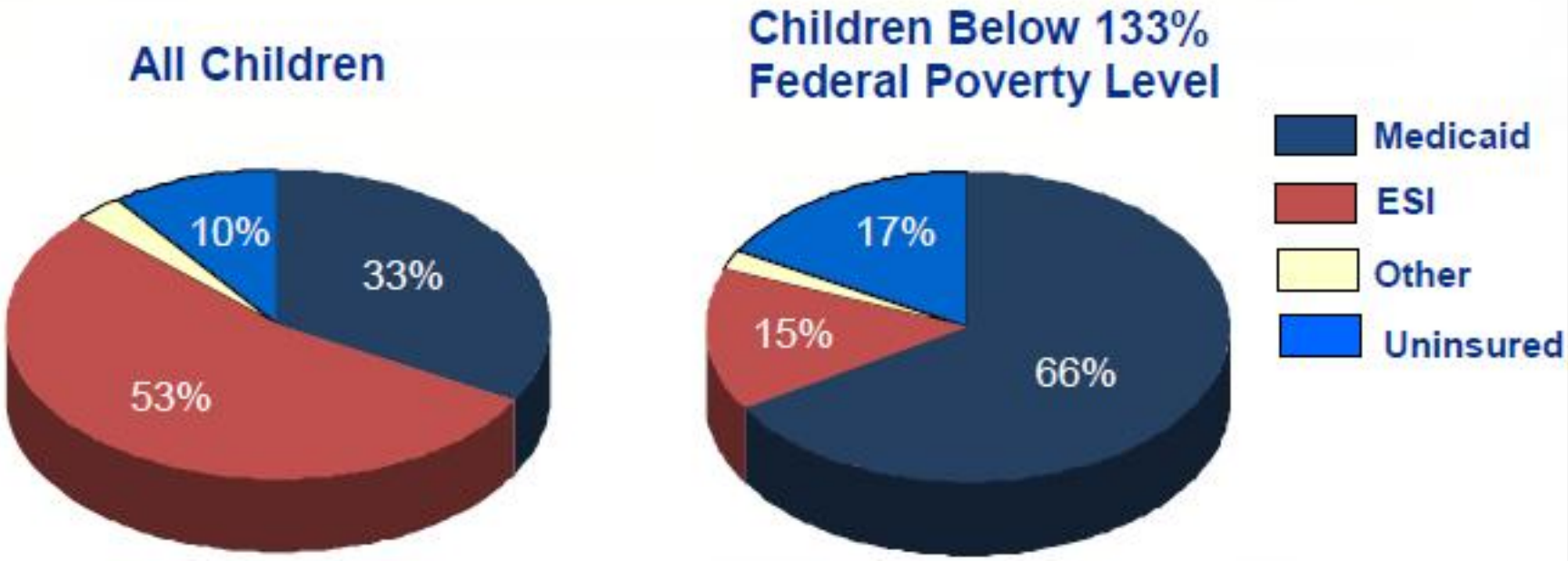
- Prevention is critical, especially for more common chronic conditions (e.g. obesity, asthma, mental health conditions)
- Specialty care access is needed

"I'm sorry, but your HMO will pay for a pound of cure, but not an ounce of prevention."

Issues Unique to Children: D5. Dollars/ Financing

Adults	Children/ Adolescents
•Higher cost	•Overall costs are small
•Private insurers and Medicare	•Private insurers, State Medicaid and CHIP
•Focus on return on investment (ROI) on secondary and tertiary prevention	•ROI over long term and outside health sector

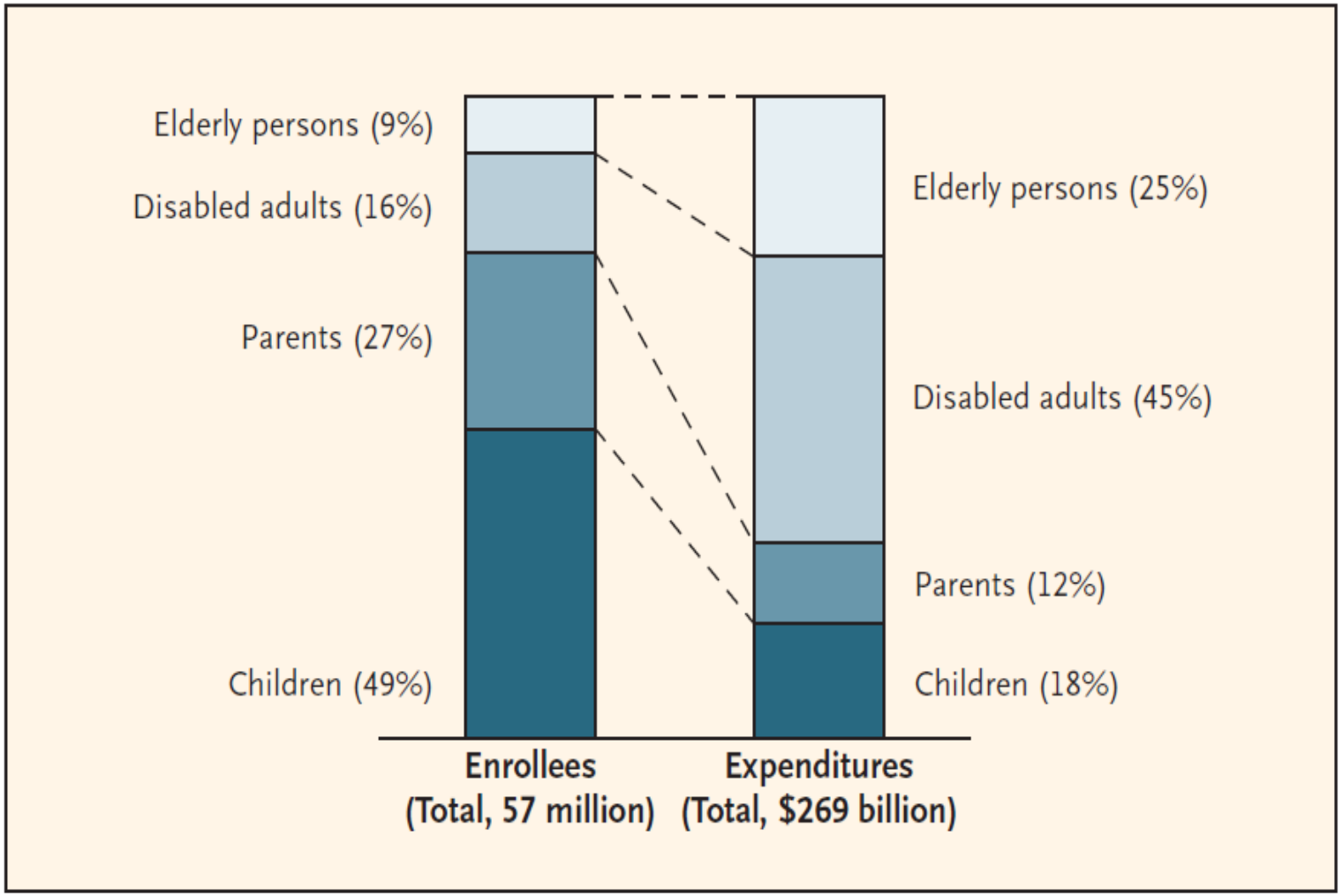
Profile of Children's Coverage, 2009



Source: HHS ASPE analysis of the 2010 Annual Social and Economic Supplement to the Current Population Survey

CMS

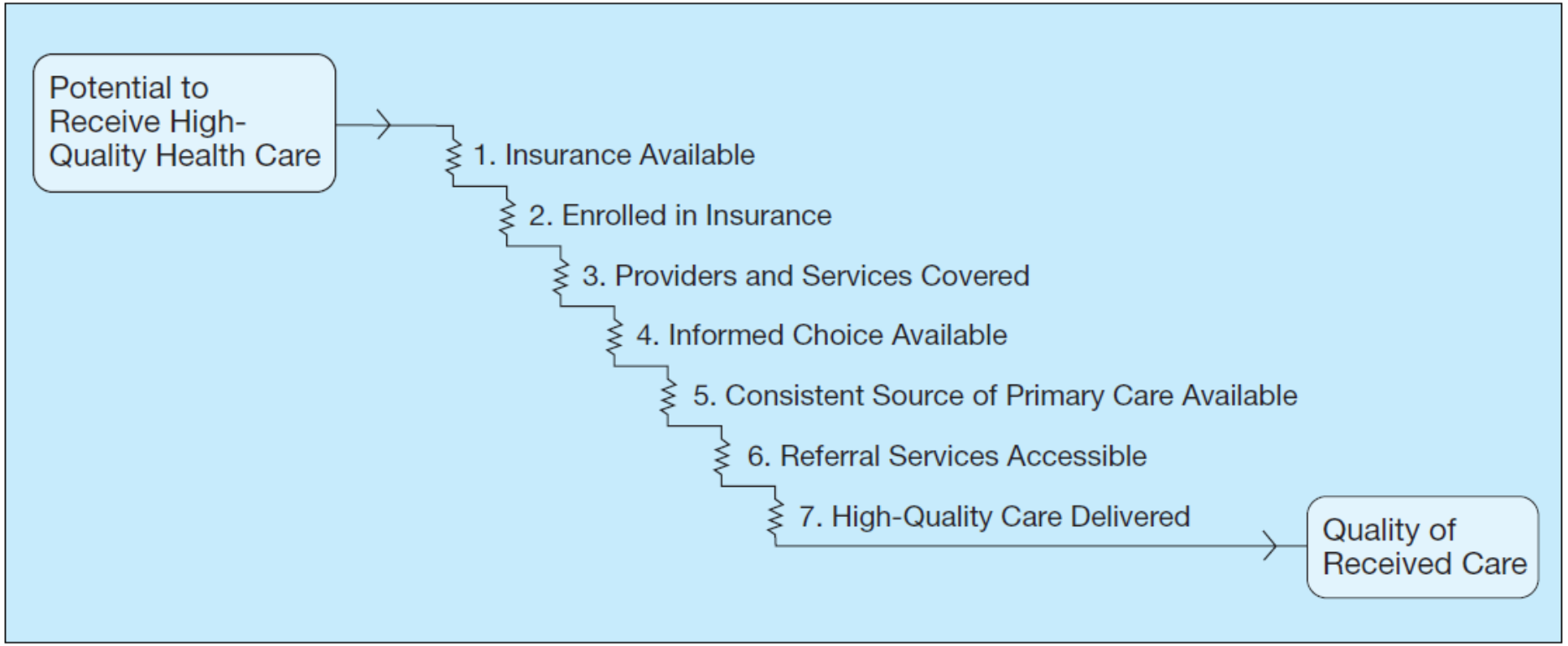
Medicaid Enrollees & Expenditures by Enrollment Group, 2004



Rowland D. **NEJM** 2005:353; 14:1440

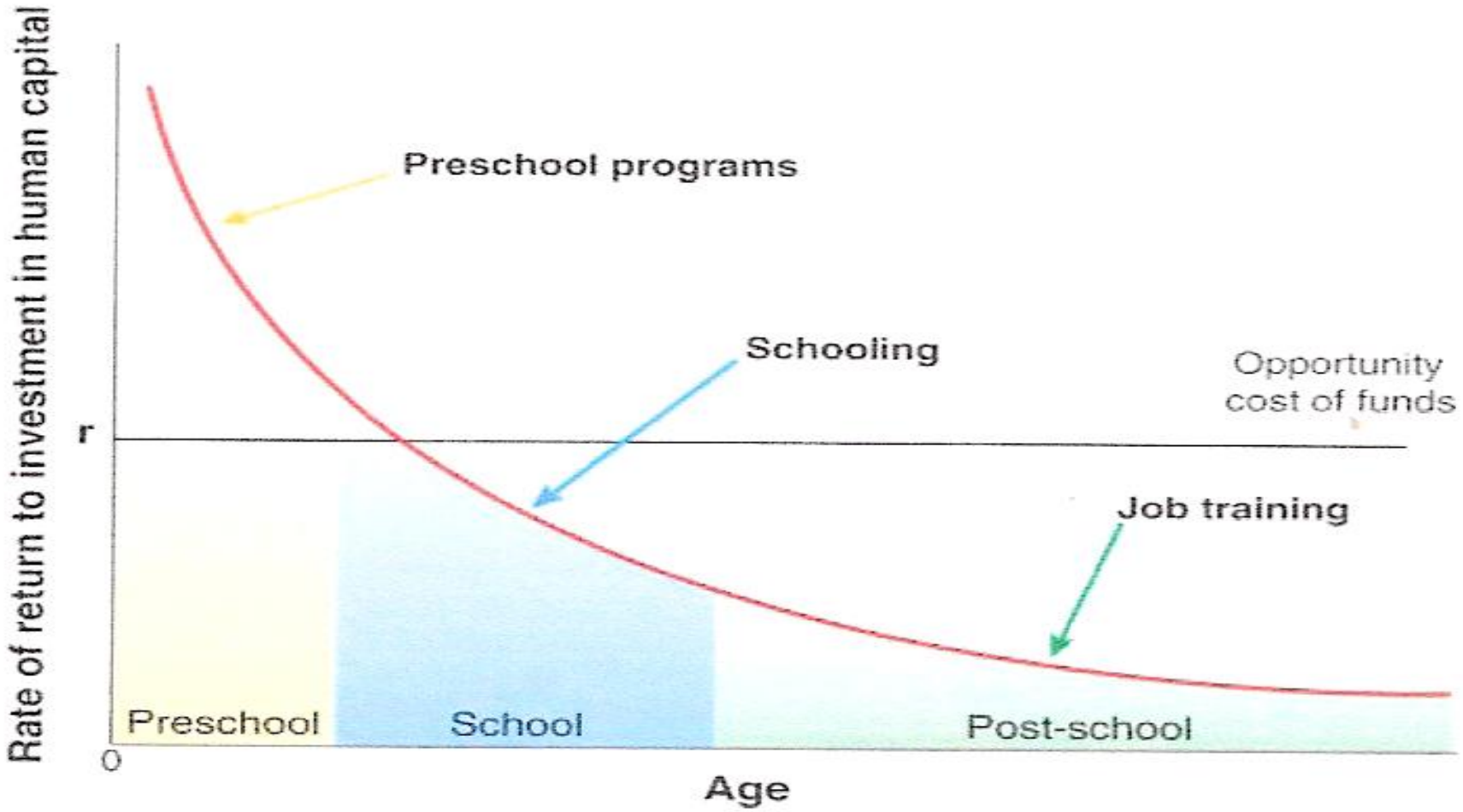
Steps to Quality Care

Figure. The Cascade of Voltage Drops From Insurance to Quality Health Care



Eisenberg JM & Power.
JAMA 2000:284:2101

Rates of Return to Human Capital Investment



Heckman J, et al. Skill Formation and the Economics of Investing in Disadvantaged Children. **Science**. 312, June 2007

Economic Perspective

- Early investment in the well-being and skill formation of disadvantaged children pays off (Heckman JJ. **Science.** 2006;312:1900-1902).
- Telluride Principles for Investing in Young Children (www.partnershipforsuccess.org)
  - long-term US economic strength and fiscal sustainability depends on a future workforce
  - investing in children is a vital economic growth strategy

D5. Dollars/Financing: Implications

- Need for a consistent base for financing child/adolescent health care
- Financing proposals must consider child financing mechanisms and child benefits
  - EPSDT must incorporate a comprehensive child benefits package
  - Reimbursement for primary care and specialty providers for children must be adequate (Medicaid reimbursement is approx 70% of Medicare reimbursement)
  - Incentives are needed for adult providers caring for complex young adults with pediatric onset conditions

D5. Dollars/Financing: Implications

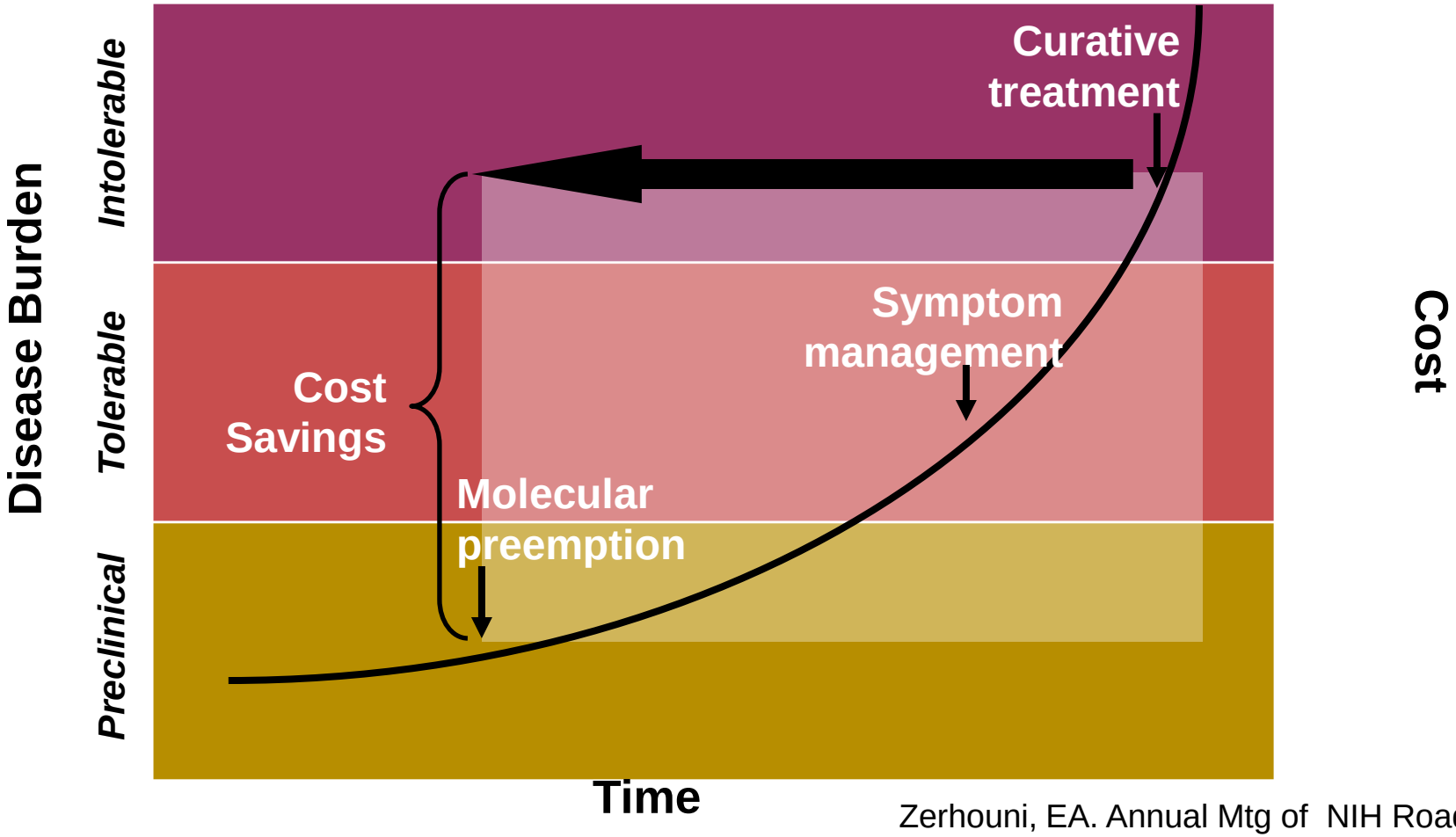
- Return on investment evaluation must consider benefits outside the health care system
- A longer time horizon and scope are needed when measuring ROI
- A life course perspective makes sense for research and policy

History of Medical Progress

19th Century	20th Century	21st Century
Treat **symptoms**	Treat **diseases**	**Predictive** **Preemptive** **Participatory** **Personalized**

Adapted from E. Zerhouni, A Vision for Transforming Medicine in the 21st Century, 9/13/06, http://www.nih.gov/about/director/slides/vision.pdf

The Future Paradigm: 4 P's



Zerhouni, EA. Annual Mtg of NIH Roadmap Multidisciplinary Clinical Research Career Dev Program, 2007

History of Medical Progress: 9 P's

19th Century	20th Century	21st Century
Treat **symptoms**	Treat **diseases**	**Predictive** **Preemptive** **Participatory** **Personalized** **Pediatrics** **Prenatal, Preconception** **Population Health, Policy**

The Evolution of Health Disparities Research

- 1st Era: Poverty as Threshold
- 2nd Era: Gradients
- 3rd Era: Measurement, mechanisms
- 4th Era: Multiple Levels of Influence
- 5th Era: Interactions, Systems, Causality
- 6th Era: ?? Intervention and Translation to Programs & Policy

Adler & Stewart. Ann NY Acad Sci 2010;1186:5-23

NCS Formative Research: Measuring Child Health Disparities

JOHNS HOPKINS MEDICINE

The Healthy Beginnings Study

National Children's Study

- Aim: To examine the effects of the environment, as broadly defined to include factors such as air, water, diet, sound, family dynamics, community and cultural influences, and genetics on the growth, development, and health of children across the US, following them from before birth until 21 years of age.
- Largest long-term study of children's health and development ever to be conducted in the U.S.
- Longitudinal study of 100,000 children, their families, and their environment

NCS Formative Study
Measuring Child Health Disparities

THE NATIONAL CHILDREN'S STUDY
HEALTH GROWTH ENVIRONMENT

Aim 1: To assess content, criterion and construct validity of measures of discrimination, health literacy, acculturation, and health care access, utilization, and quality in diverse populations

NCS Formative Study
Measuring Child Health Disparities

THE NATIONAL CHILDREN'S STUDY
HEALTH GROWTH ENVIRONMENT

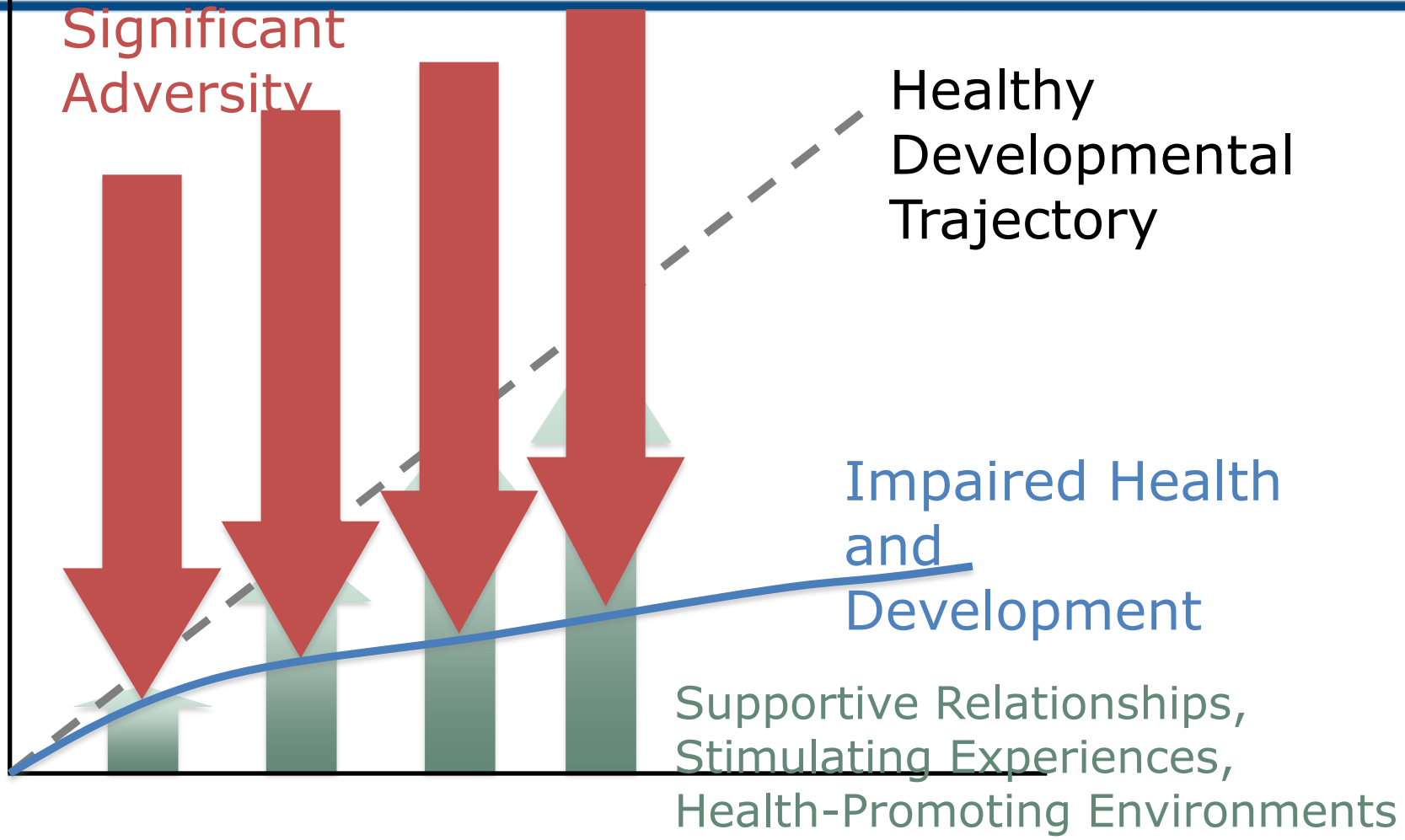
Aim 2: To assess the biologic and behavioral responses that place individual children at increased risk for both short-term and long-term poor health outcomes and disease utilizing saliva measurement of stress and inflammatory markers and cotinine in pregnant mothers and mothers and their children.

The Evolution of Health Disparities Research

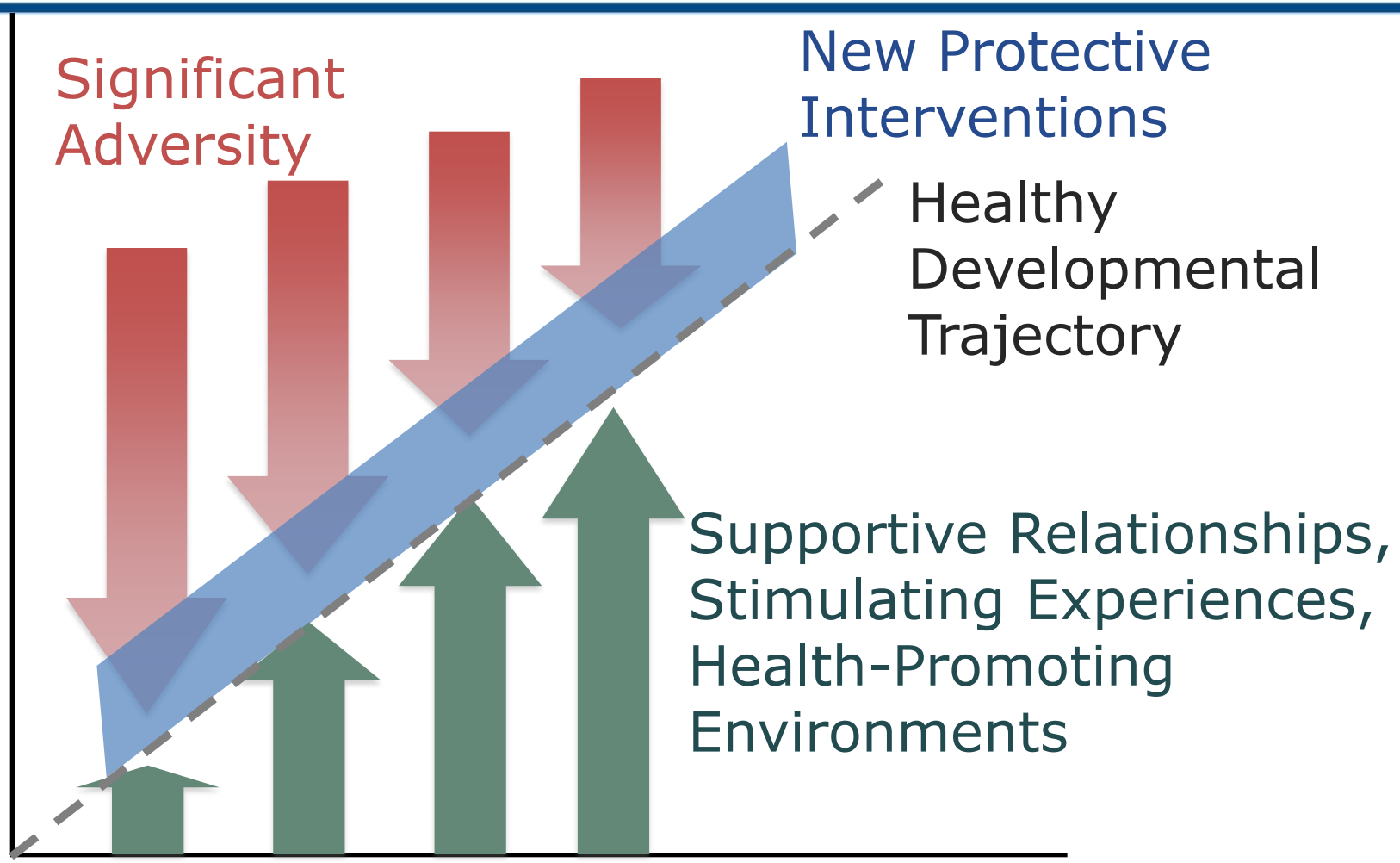
- 1st Era: Poverty as Threshold
- 2nd Era: Gradients
- 3rd Era: Measurement, mechanisms
- 4th Era: Multiple Levels of Influence
- 5th Era: Interactions, Systems, Causality
- 6th Era: ?? **Intervention and Translation to Programs & Policy**

Adler & Stewart. Ann NY Acad Sci 2010;1186:5-23

Trajectories: Conceptual Framework Guiding Early Childhood Policy & Practice



Protective Interventions



Take Charge! Study

ARTICLE

Effectiveness of a Mentor-Implemented, Violence Prevention Intervention for Assault-Injured Youths Presenting to the Emergency Department: Results of a Randomized Trial

Tina L. Cheng, MD, MPH[a], Denise Haynie, PhD, MPH[b], Ruth Brenner, MD, MPH[c], Joseph L. Wright, MD, MPH[d], Shang-en Chung, ScM[a], Bruce Simons-Morton, EdD, MPH[b]

[a]Department of Pediatrics, Johns Hopkins University, Baltimore, Maryland; Departments of [b]Prevention Research and [c]National Children's Study Program Office, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, Department of Health and Human Services, Bethesda, Maryland; [d]Child Health Advocacy Institute, Children's National Medical Center, Washington, DC

Cheng TL et al. **Pediatrics**. 2008;122(5):938-46.

Take Charge! 2.0

- Aims:
  - To test the effectiveness of the TakeCharge! 2.0 with assault-injured youth presenting to the emergency department in improving health and educational outcomes
  - To test the cost-effectiveness of TakeCharge! 2.0
- Design: Randomized trial of intervention or limited case management, DC and Baltimore
- Participants: Assault injured youth age 10-15 and their parents/guardians

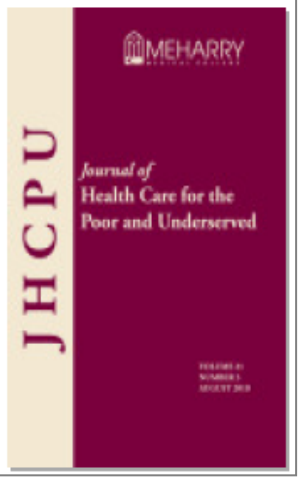
Take Charge! 2.0

- Intervention through Big Brothers, Big Sisters:
  - Youth “mentoring” and social skills/problem solving curriculum, 6-8 sessions
  - Parent curriculum on parental involvement and monitoring, 3 sessions
  - Linkage to community services
  - Web enhancements
- Measurement:
  - In home face-to-face and audiotape interviews with youth and parent at baseline, 6 and 18 mos
- Health and Education outcomes

Priorities of Low-Income Urban Residents for Interventions to Address the Socio-Economic Determinants of Health

Marion Danis
Namrata Kotwani
Joanne Garrett
Ivonne Rivera
More

Journal of Health Care for the Poor and Underserved, Volume 21, Number 4, November 2010, pp. 1318-1339 (Article)

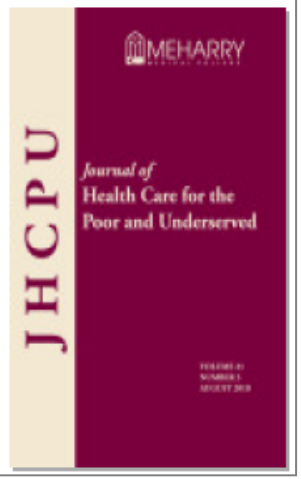


- 95% Health insurance
- 82% Housing vouchers
- 82% Dental care
- 72% Job training

Priorities of Low-Income Urban Residents for Interventions to Address the Socio-Economic Determinants of Health

Marion Danis
Namrata Kotwani
Joanne Garrett
Ivonne Rivera
More

Journal of Health Care for the Poor and Underserved, Volume 21, Number 4, November 2010, pp. 1318-1339 (Article)

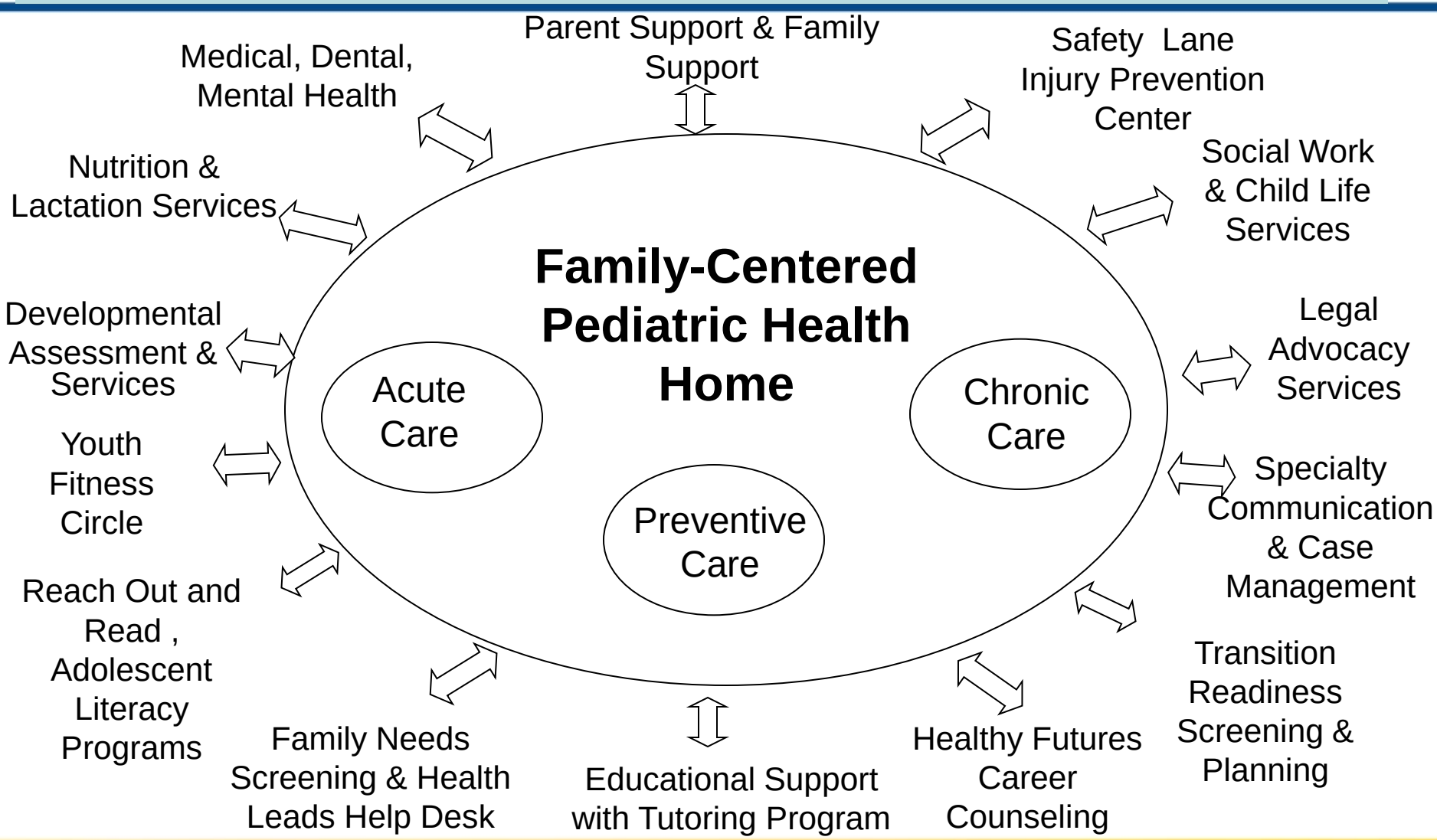


- 95% Health insurance
- 82% Housing vouchers
- 82% Dental care
- 72% Job training

➢ Quality child care, education & opportunities for their children
➢ Safe homes & neighborhoods

Harriet Lane Clinic

Director, Barry Solomon, MD, MPH

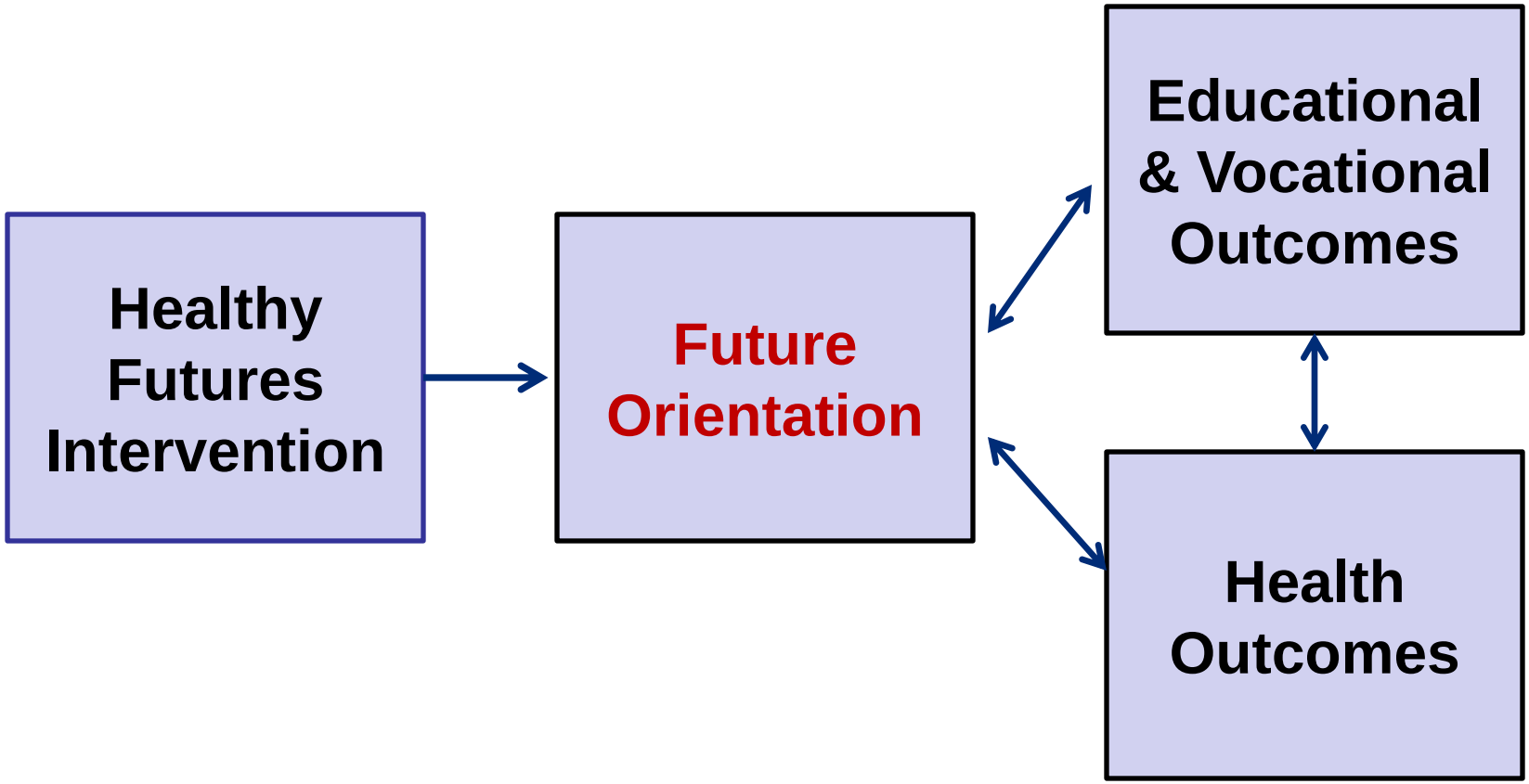


Healthy Futures Study

TL Cheng, S Lindstrom Johnson, V Jones

- Aim: To test the effectiveness of a future orientation motivational interviewing intervention to promote transition to adulthood.
- Design: Randomized controlled trial
- Participants: Harriet Lane Clinic patients 14-21 yrs
- Intervention: 3 MI sessions with “career coach” plus workshops, and email, phone follow-ups
- Measurement: Interviews at baseline, 6 and 15 mos
- Outcomes: Future orientation, risk behavior, educational and job outcomes

Hypothesized Healthy Futures Pathway



Participant Demographics (n=200)

Characteristics	Comparison Participants	Intervention Participants
Mean Age	16.77 (1.98)	16.59 (2.08)
Gender		
Male	38 (38.4%)	42 (41.6%)
Female	61 (61.6%)	59 (58.4%)
Race		
African American	94(94.9%)	98 (97.0%)
Other	5 (5.1%)	3 (3.0%)
Maternal Education		
≤ High School	55 (57.9%)	57 (60.6%)
> High School	40(42.1%)	37 (39.1%)
Academic Achievement		
Mostly A's and B's	56 (57.1%)	62 (61.4%)
Mostly C's and D's	42 (42.9%)	39 (38.6%)

Preliminary 15 Month Results: Future Orientation Outcomes

Future Orientation Outcomes (n=112) Linear Regression	Intent to Treat (Intervention vs Comparison) Beta
Career Behaviors and Knowledge	3.01*
Career Expectancies	3.91**

Adjusted for age and gender
* p<.05; ** p<.01; *** p<.001

Preliminary 15 month results: Health Outcomes

Health Outcomes (n=112) Negative Binomial Regression	Intent to Treat (Intervention vs. Comparison) Rate Ratio
No. fights in past 30 days	.27[t]
Damaged property past 30 days	.20[t]
No. times used marijuana past 30 days[a]	.17***

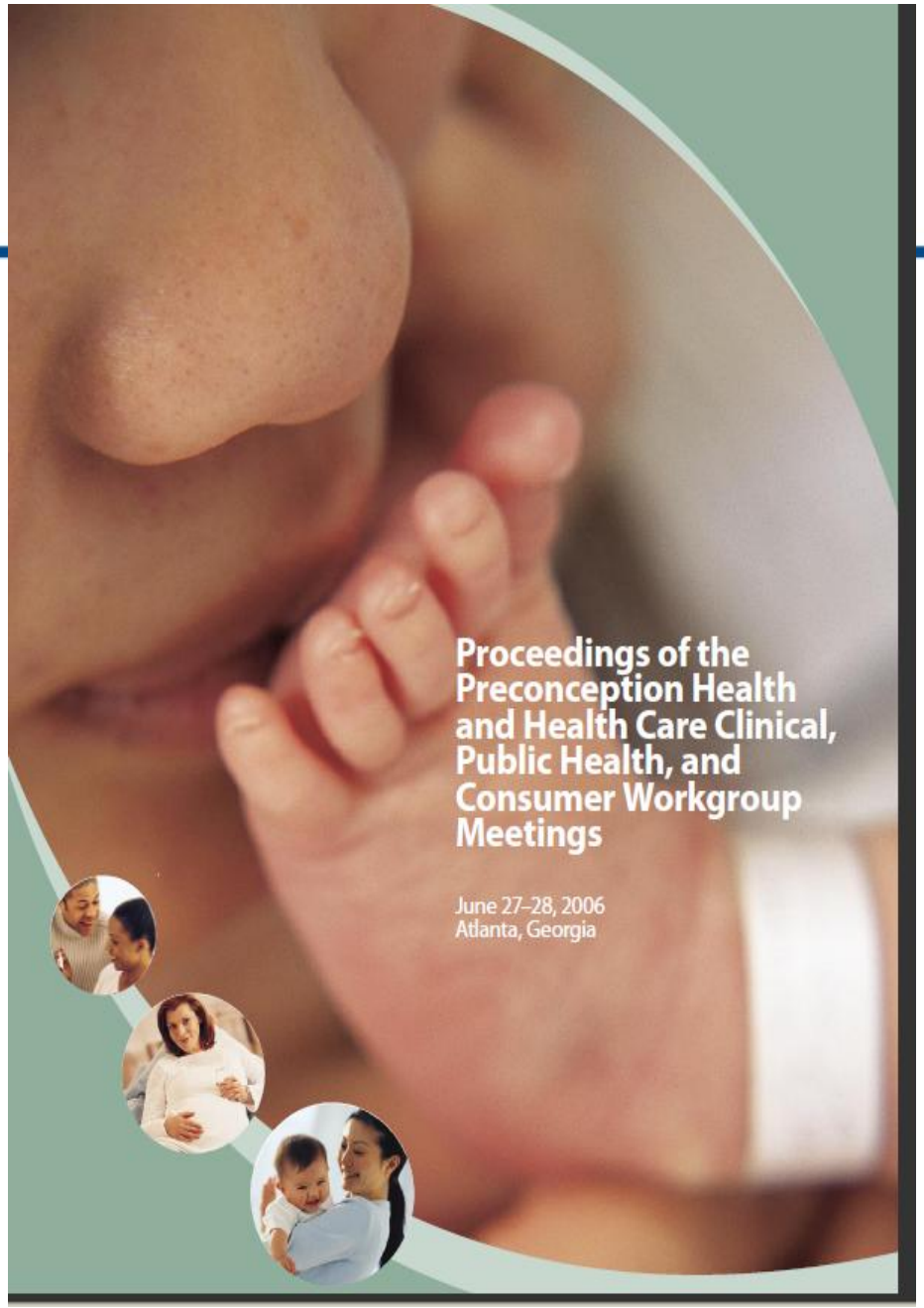
Adjusted for age, gender

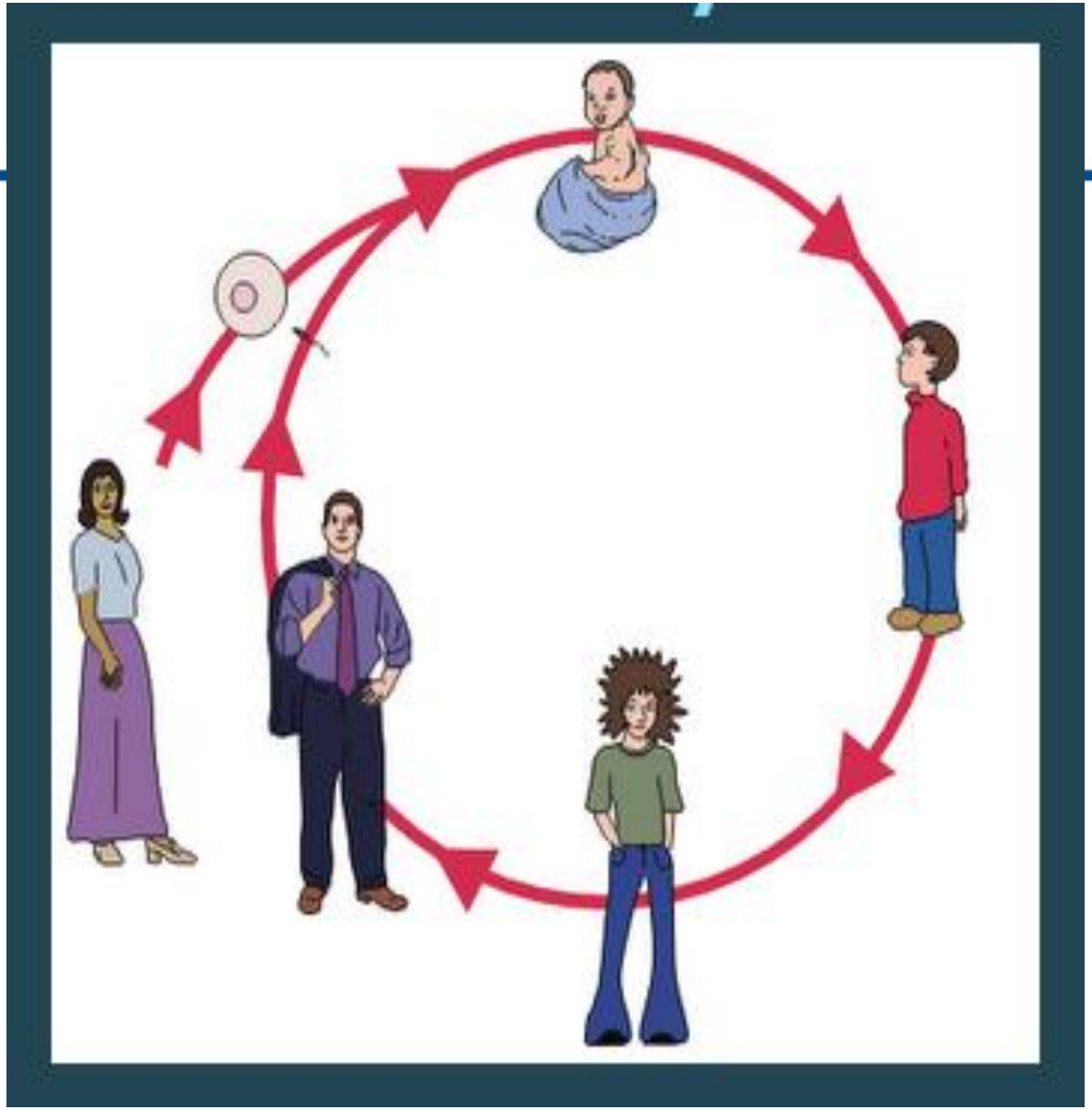
[t] p<.10;* p<.05; ** p<.01; *** p<.001

[a] evidence of mediation by future orientation

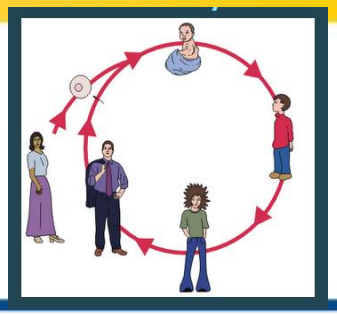
Conclusions

- A motivational interviewing intervention on future jobs and education can influence future orientation and reduce risk behaviors
- The concept of future orientation may be a modifiable construct and associated with risk behavior


Proceedings of the Preconception Health and Health Care Clinical, Public Health, and Consumer Workgroup Meetings
June 27–28, 2006
Atlanta, Georgia

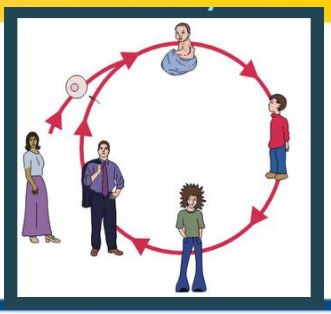


Harriet Lane Clinic
New Mother Interviews (N=79)



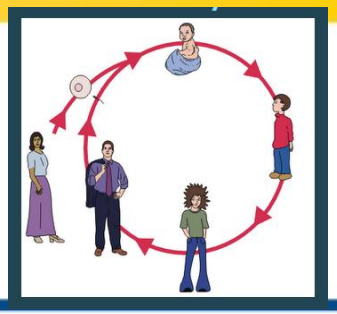
- Age: 43 (54%) 21 years or younger
- Primary care provider for themselves?
  - 21 (27%) had a primary care provider
- Have insurance after pregnancy?
  - 35 (44%) no insurance
- Planned Pregnancy?
  - 70 (89%) unplanned
- Interest in having their primary care provided by the clinician for their child?
  - 67 (85%) said yes

Preconception Women's Health in Pediatrics



Aims:

- To assess women's health care access, reproductive life plan and interest in preconception care (PCC) or primary care by their child's physician
- To assess the feasibility and effectiveness of PCC provided by pediatric clinicians
- To assess the cost-effectiveness of the model



"A true measure of a nation's standing is how well it attends to its children – their health and safety, their material security, their education, socialization and their sense of being loved, valued and included in the families and societies into which they were born."

UNICEF Innocenti Report, 2007