

Discussion:

Biological Pathways of Inequalities in Children's Health

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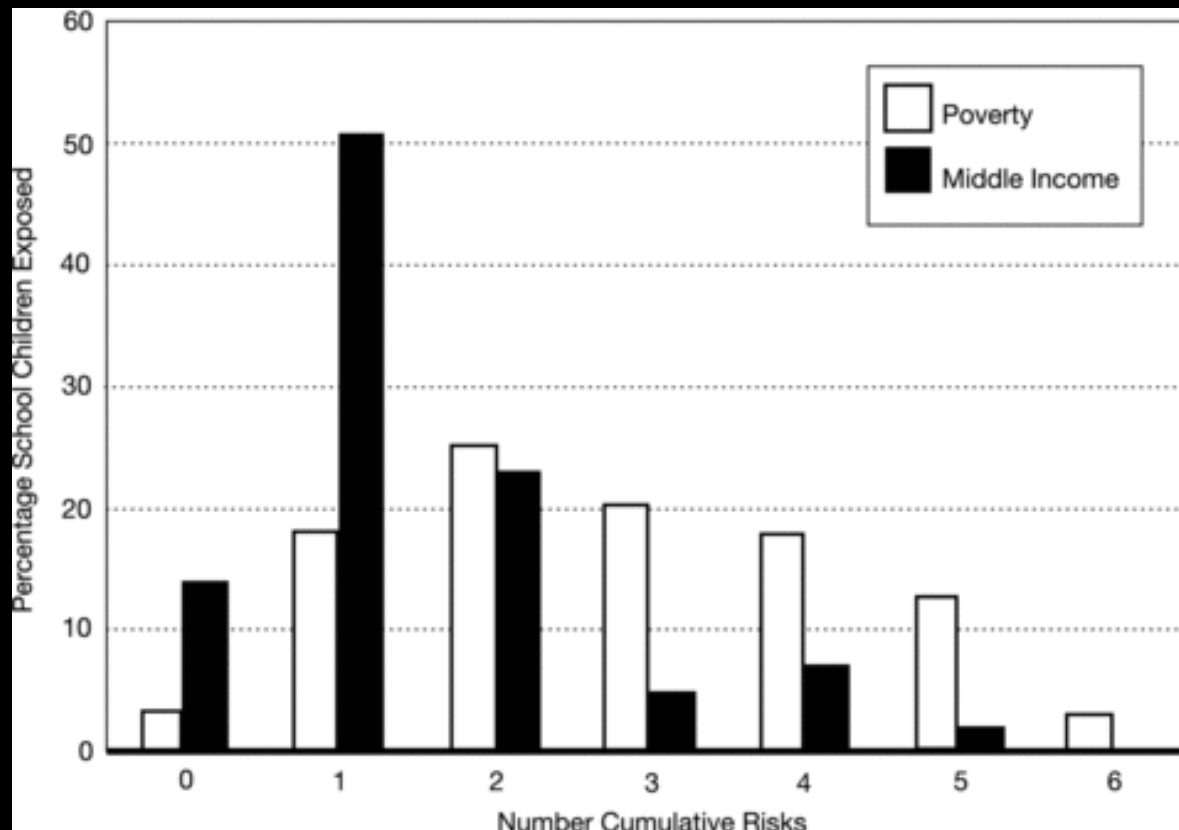
INRICH, Ithaca NY
June 15, 2017



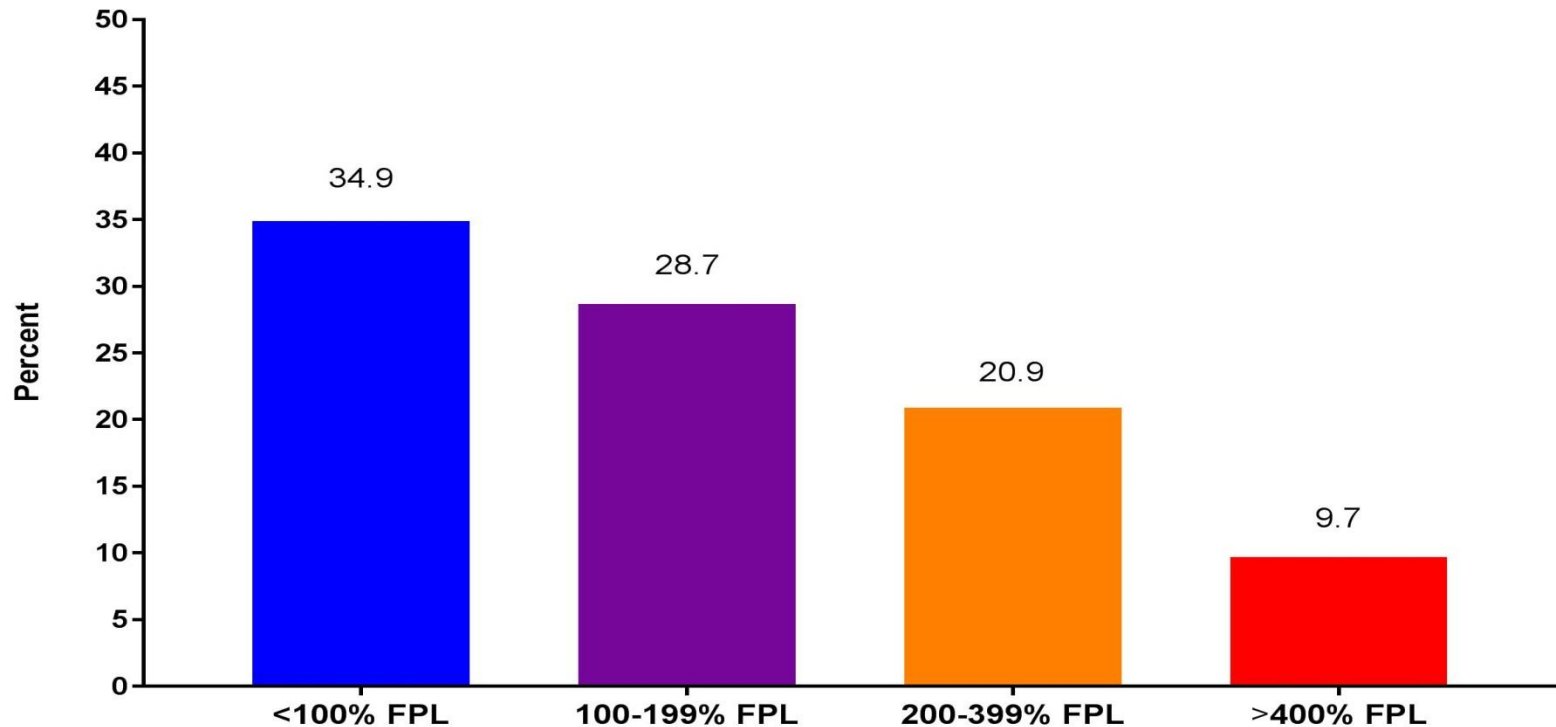
Agenda

1. Future directions for assessment of childhood exposures.
2. Inflammation as a mechanism for the biological embedding of childhood adversity.
3. Effectiveness of social interventions to protect against the biological embedding of adversity.

Poverty in childhood is not simply low income relative to needs, but also exposure to disadvantaged environments more generally



Children aged 0-17 years experiencing 2+ adverse childhood experiences, by poverty status (2011-12)



FPL=federal poverty level, defined by DHHS poverty guidelines; poverty was \$23,050 for a family of four in 2012.

Source: Health Resources and Services Administration, Maternal and Child Health Bureau; and Centers for Disease Control and Prevention. National Center for Health Statistics, National Survey of Children's Health, 2011-2012

Where next?

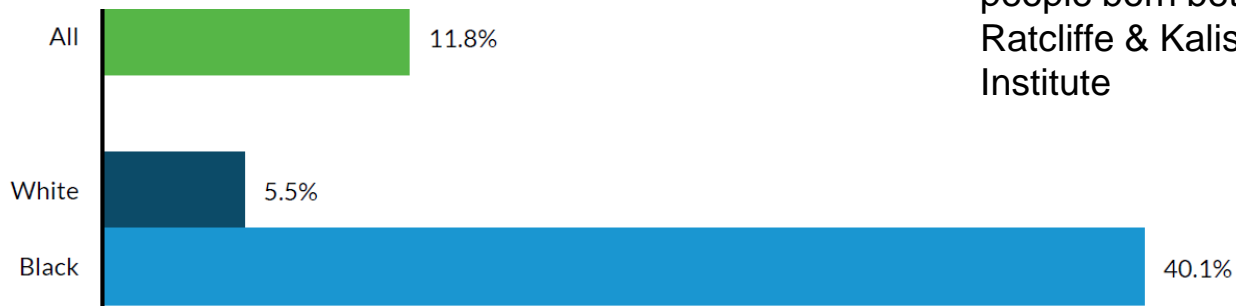


Montage photos: Torbak Hopper/Flickr, Nick Normal/Flickr, Luis Felipe Salas/Flickr, Sage Solar/Flickr

1. Developmental perspective

Chronicity of exposure¹

Percent poor at least half of childhood



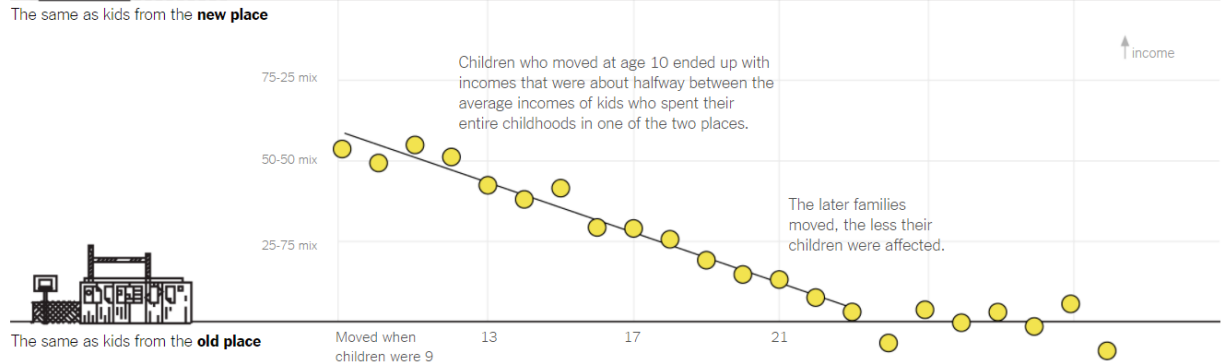
¹ Panel Study of Income Dynamics, people born between 1968 and 1985; Ratcliffe & Kalish, May 2017, Urban Institute

Timing of exposure²



The same as kids from the **new place**

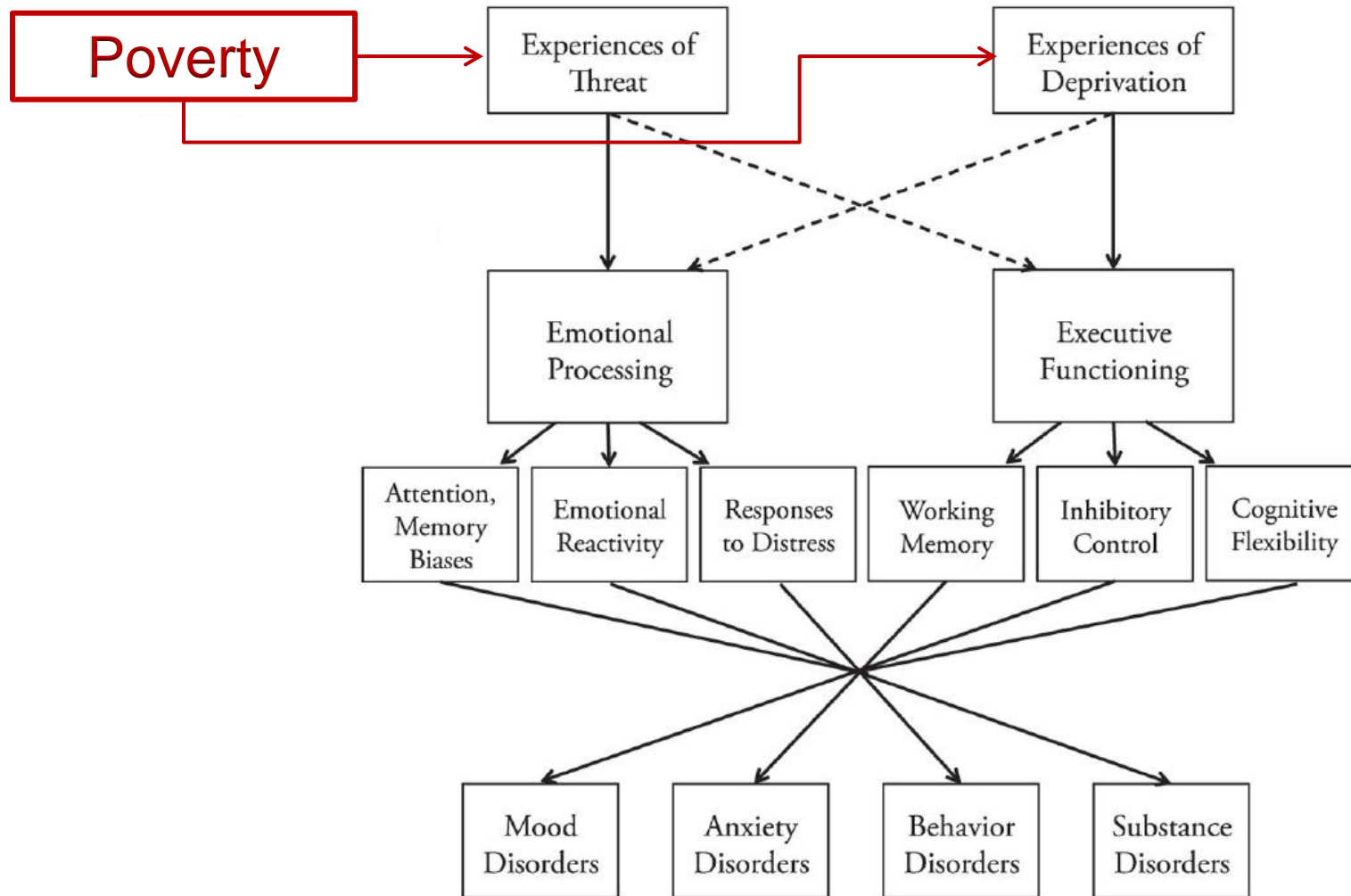
Income in adulthood for **children whose families moved** to a better place



The same as kids from the **old place**

² Moving to Opportunity; Chetty et al. 2015, *American Economic Review* 106(4): 855-902, 2016

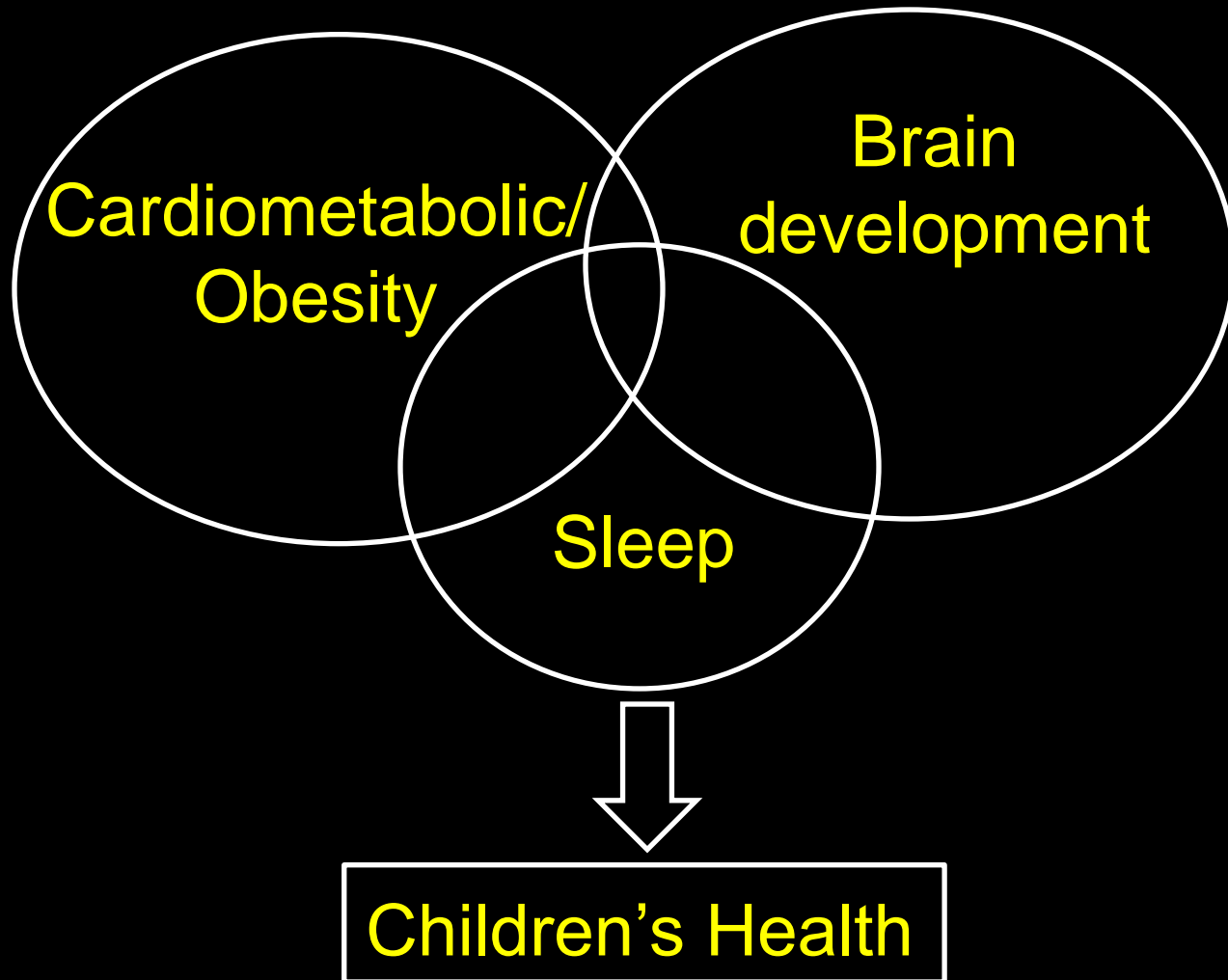
2. Dimensional Approaches



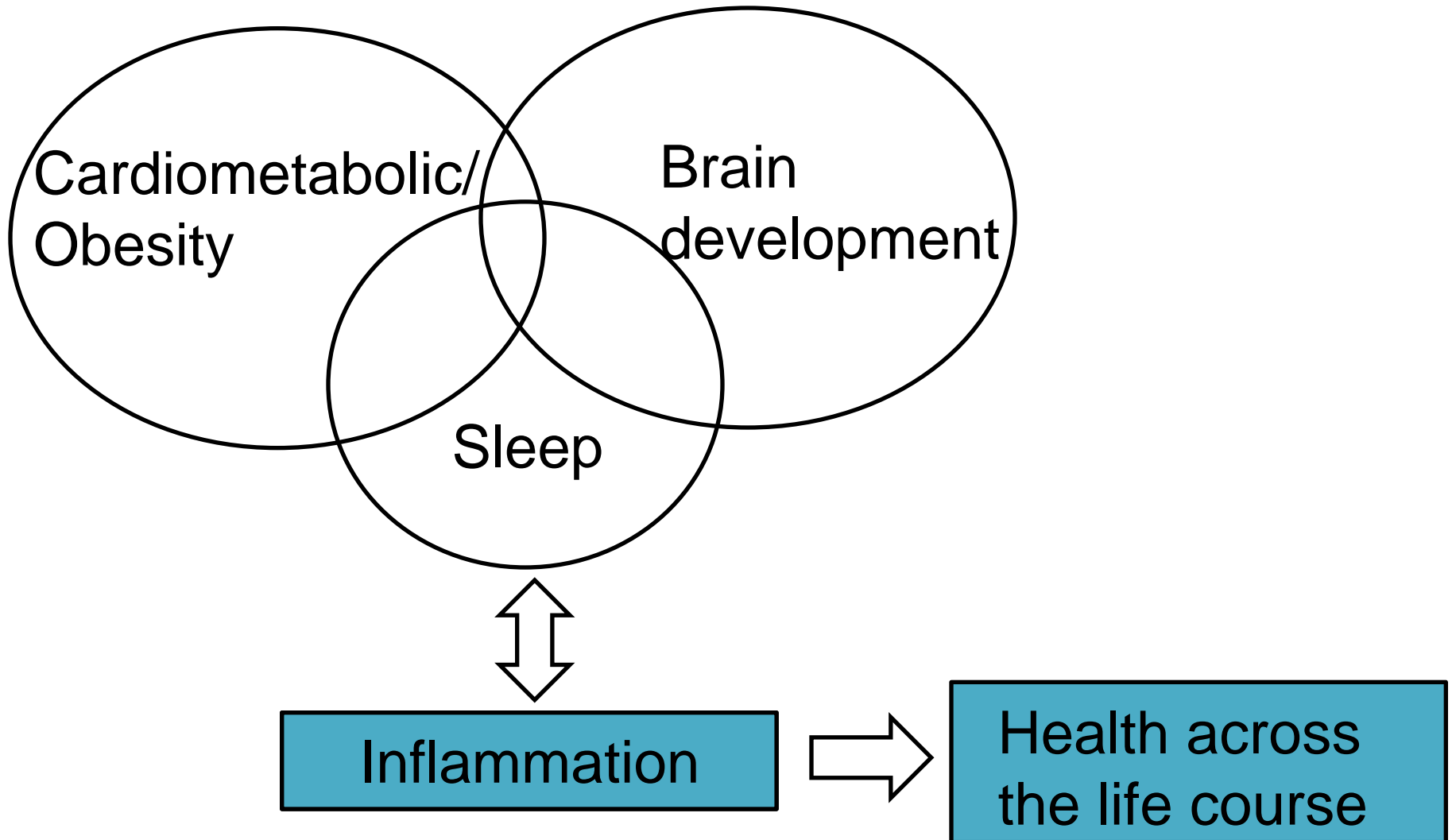
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Childhood Socioeconomic Status/ Poverty

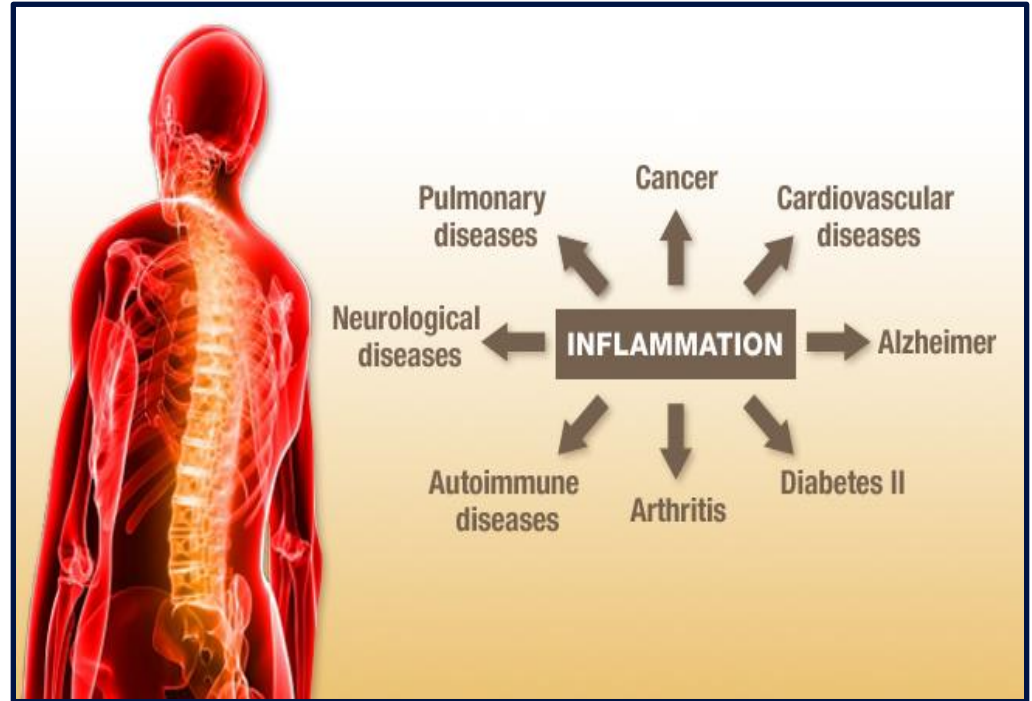


Childhood Socioeconomic Status/ Poverty



Inflammation

- Part of normal stress response
- Elevated levels adaptive in short term, maladaptive over time
- Physiological mechanism linking adverse social conditions to health over the life course?



Childhood adversity and immune and inflammatory biomarkers associated with cardiovascular risk in youth: A systematic review

Natalie Slopen^{a,b,c,*}, Karestan C. Koenen^{a,b,d}, Laura D. Kubzansky^b

Brain, Behavior, and Immunity 26 (2012) 239–250

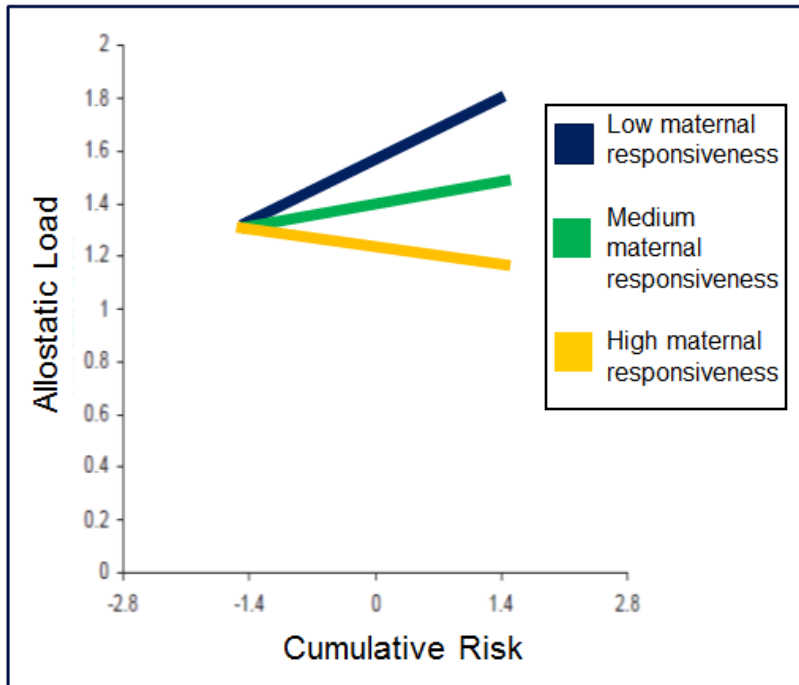
Summary of systematic review (n=20 studies)

Biomarker	# of studies	# significantly > level associated with adversity	# of mixed¹ or conditional results	# of null studies
CRP	11	3	5	3
Cytokines	5	3	2	0
Fibrinogen	4	1	1	2
Natural killer cells	2	0	2	0
Immune control of CMV	2	1	1	0
TOTAL		8	11	5

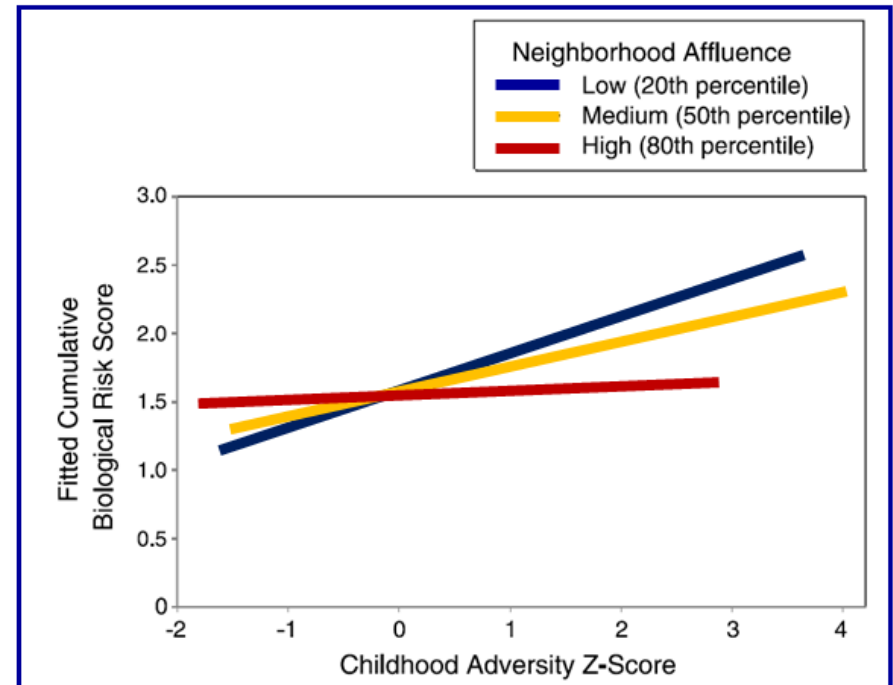
¹ “Mixed” refers to inconsistent results across multiple measures of adversity

Where next?

Social and contextual modifiers



Maternal responsiveness modified assoc. between cumulative social risk exposure and allostatic load.¹



Neighborhood affluence in adulthood modified assoc. between childhood adversity and cumulative biological risk.²

¹Evans, Kim, et al, 2007: *Developmental Psychology*, 43(2), 341-351.

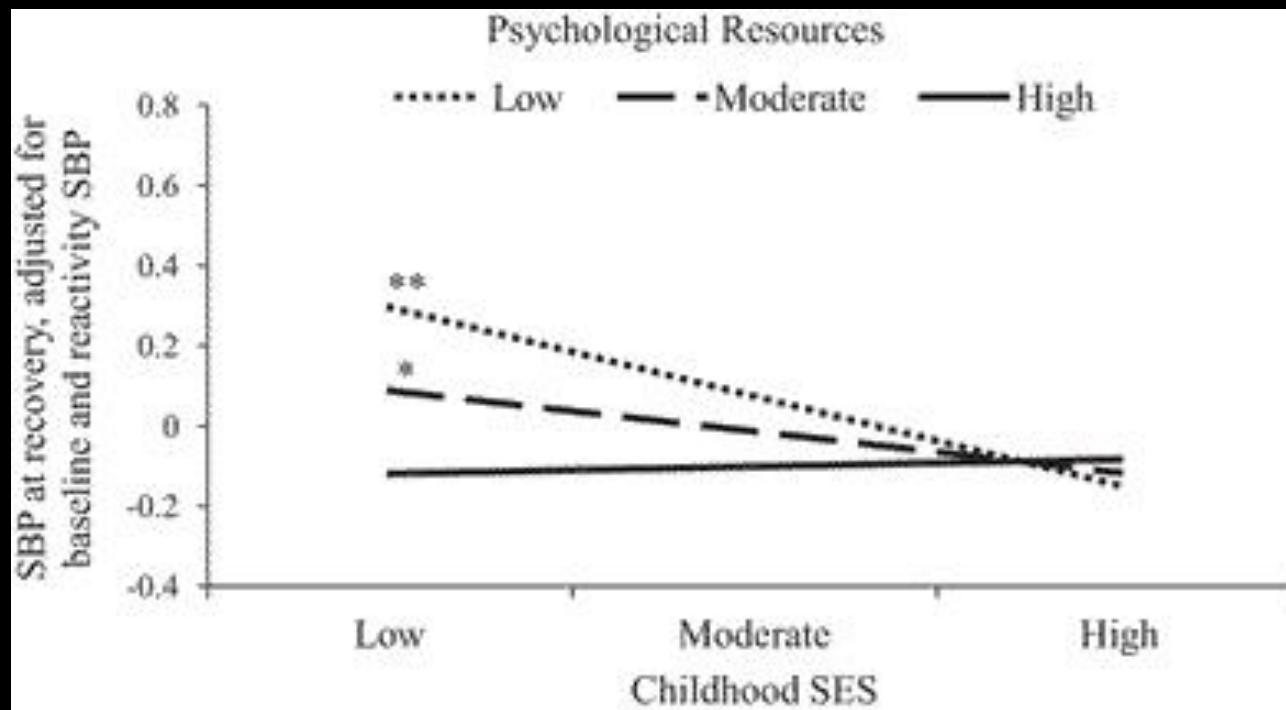
²Slopen et al. (2014), *Psychosomatic Med*, 76:481-9

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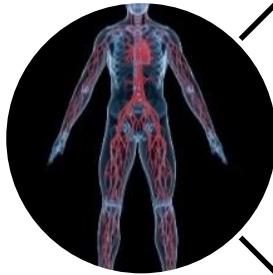
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3. **Effectiveness of social interventions to protect against biological embedding of adversity.**

Positive resources may protect men from low childhood SES

- Associations with prolonged SBP recovery were only apparent among men with fewer psychological resources



Evidence for Effective Interventions



Individual/family
interventions



School-based
interventions

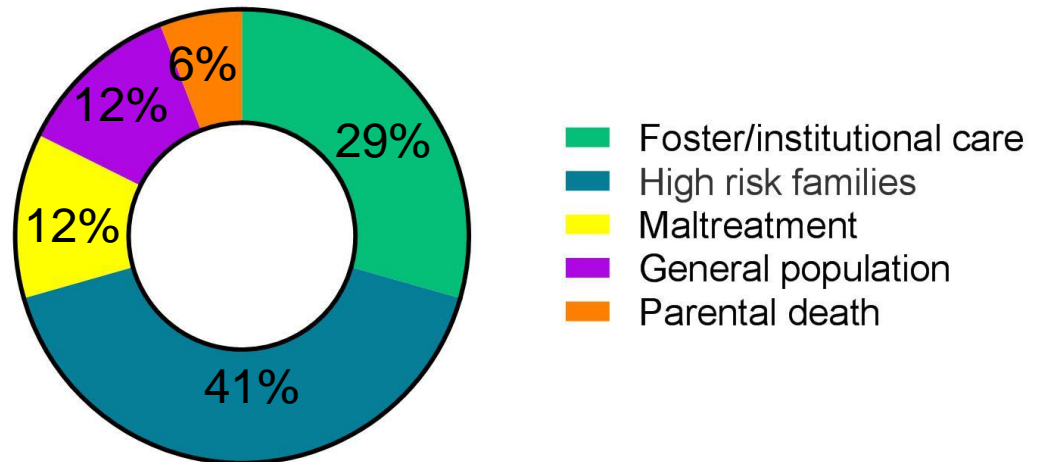


Policy interventions

Interventions to Promote Physiological Improvements in Stress-Response Physiology

Systematic review:
identified 19 articles from
17 randomized or quasi-
experimental studies:

- 1) designed to improve relationships, environments, or psychosocial functioning in children;
- 2) that examined cortisol as an outcome.

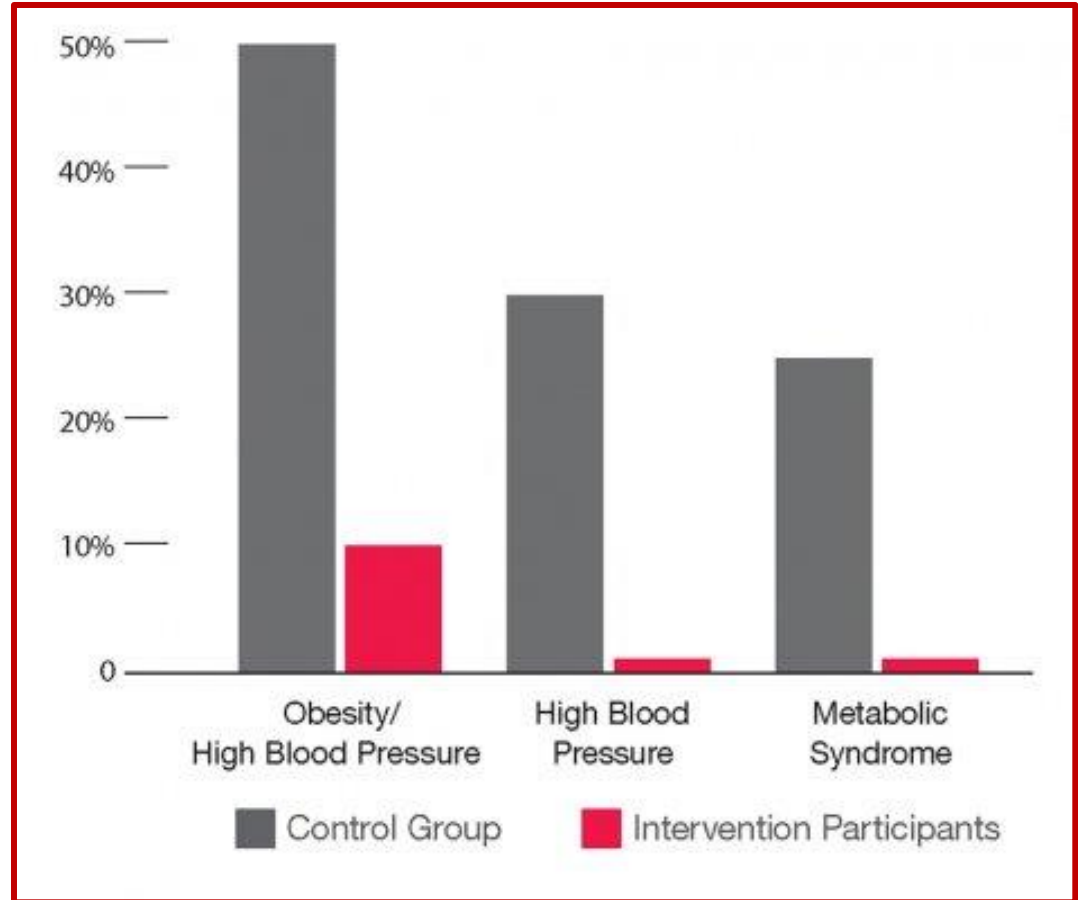


Interventions are effective

- 18 of 19 studies reported at least 1 difference in cortisol outcome between intervention and control participants.
- 8 studies included a low-risk comparison group: in all, post-intervention cortisol in the intervention group approximated low-risk comparison (& differed from usual care).
- Conclusion: cortisol activity can be altered by interventions.
- Promising evidence that it may be possible to protect and/or repair stress regulatory systems after childhood adversity.

High quality early education programming improves adult health

- Carolina Abecedarian Project, RCT, n=111 disadvantaged children
- In mid-30's: treatment group < risk factors for cardiometabolic diseases.



Social policy interventions

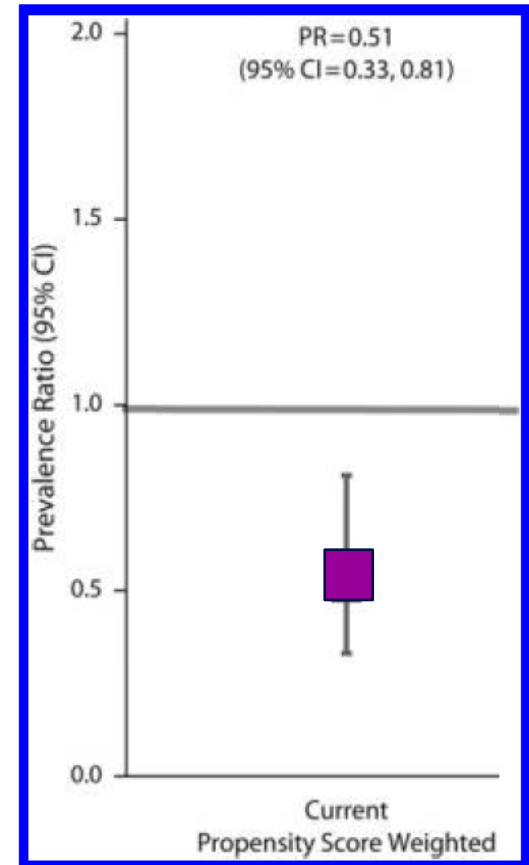
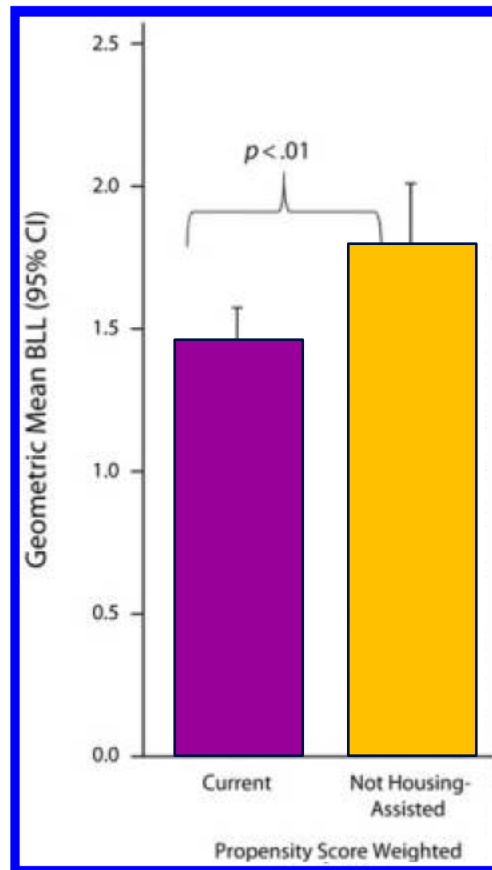
Children ages 0-5 in NHANES, linked to HUD Administrative records

Treatment group: assisted housing

Comparison group: below 200% FPL, not in assisted housing.

Children in assisted housing had lower mean blood lead level and prevalence ratio for blood lead level of ≥ 3 mg/dL.

Example: Housing Assistance and Blood Lead Level



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