

US EPA ARCHIVE DOCUMENT

State of the Science Panel: Multiple and Cumulative Impacts/Effects

“The Importance of Rigorous Analytical Strategies for Elucidating Cumulative Risk Burdens and Disproportionate Effects”

by

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Strengthening Environmental Justice Research and Decision Making:
A Symposium on the Science of
Disproportionate Environmental Health Impacts

March 17-19, Walter E. Washington Convention Center, Washington, D.C.

Combining Non-Chemical Factors and Chemical Risks

Research Traditions



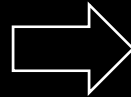
Analytical Frameworks



Models



Indicators



Decision Making

- ✓ Frame
- ✓ Screen
- ✓ Mitigate

Three Research Traditions

1.

The Social Determinants of Health
auspices of
The World Health Organization



2.

Health Disparities Research
auspices of
The National Cancer Institute

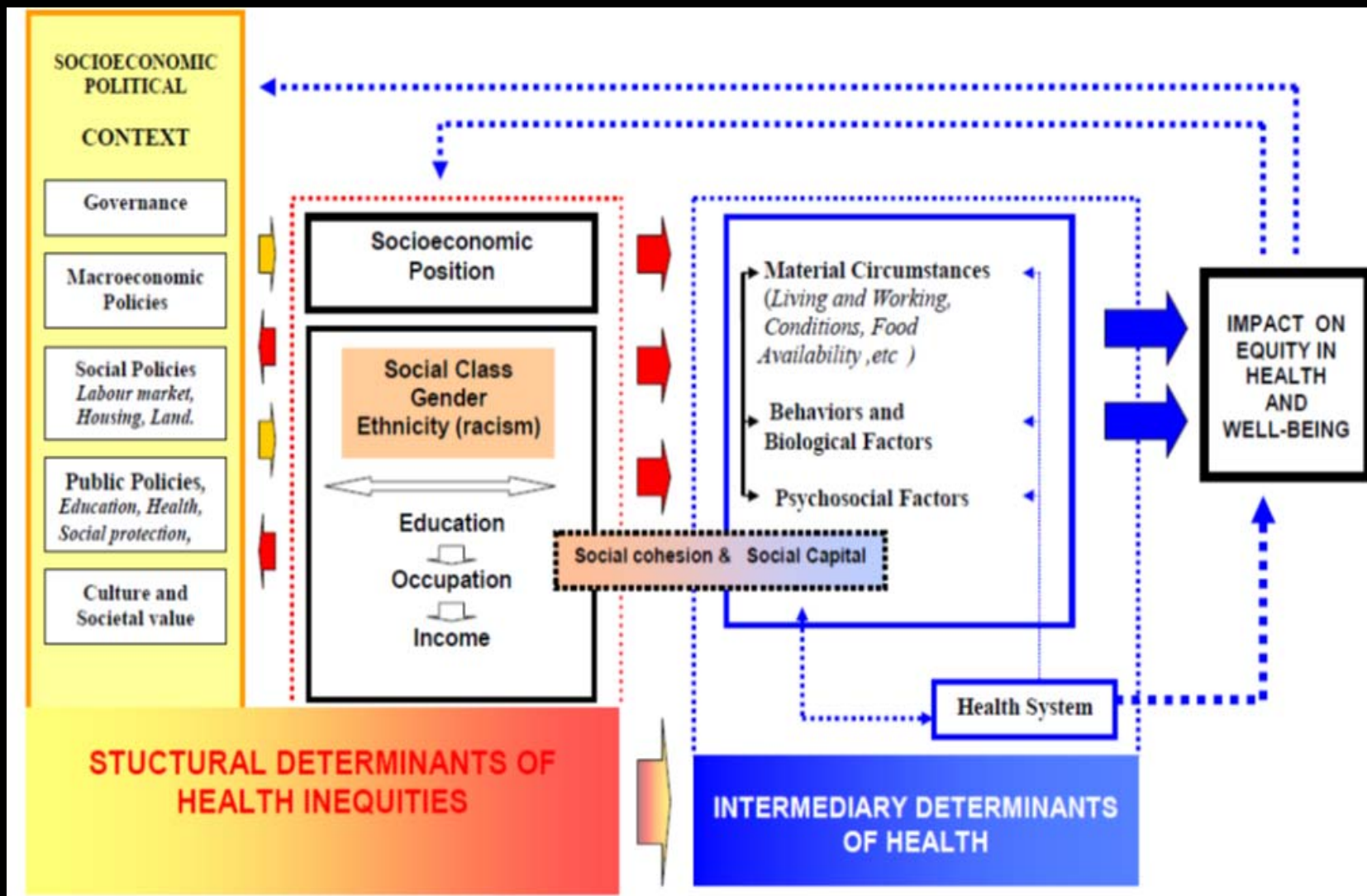


3.

Multiple Stressors Research
auspices of
U.S. Environmental Protection Agency



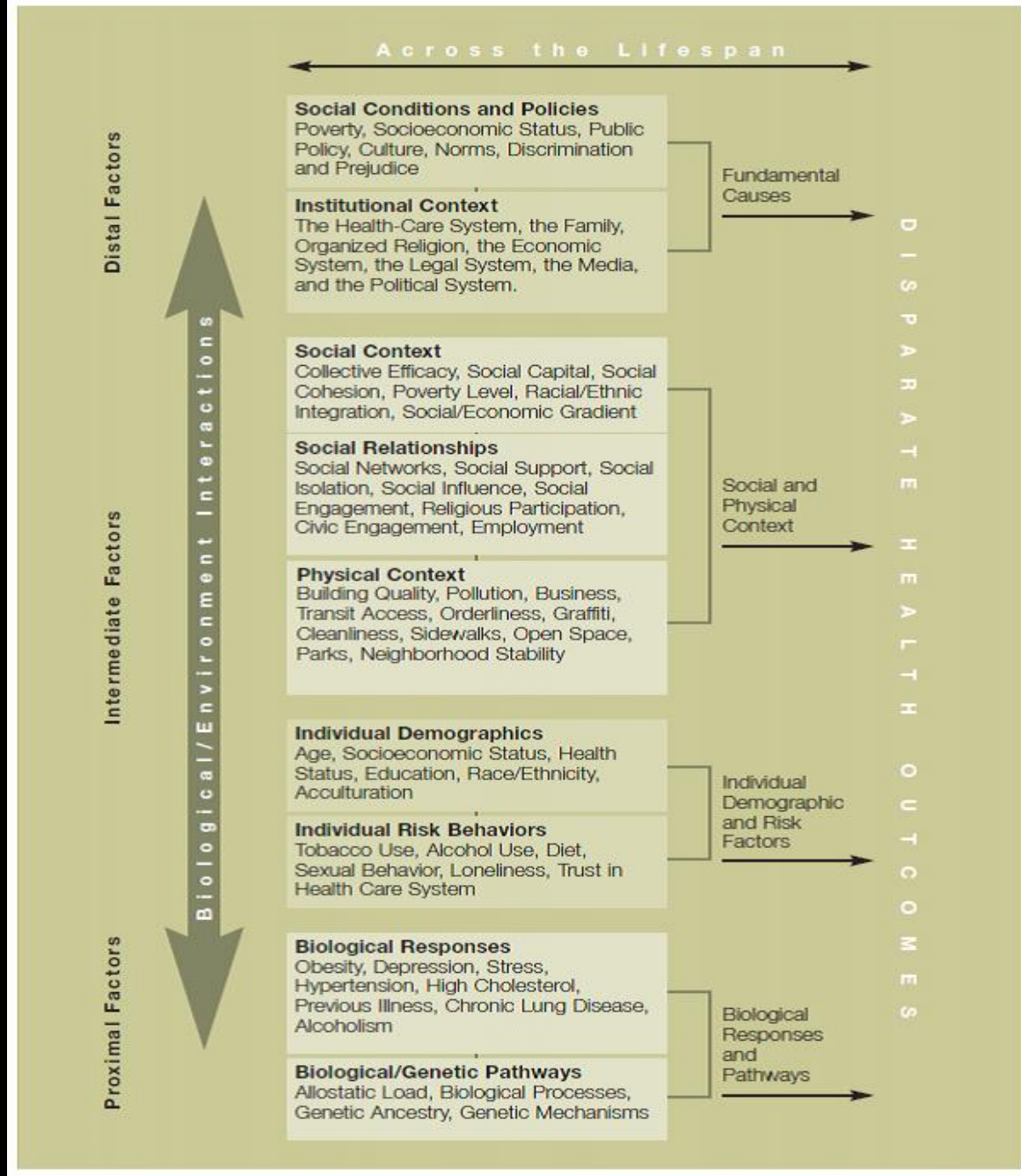
Social Determinants



From: "A Conceptual Framework for Action on the Social Determinants of Health," Discussion Papers for the WHO Commission on the Social Determinants of Health, April 2007, p.48.

Accessed at: www.who.int/social_determinants/.../csdh_framework_action_05_07.pdf

Health Disparities



Multiple Stressors

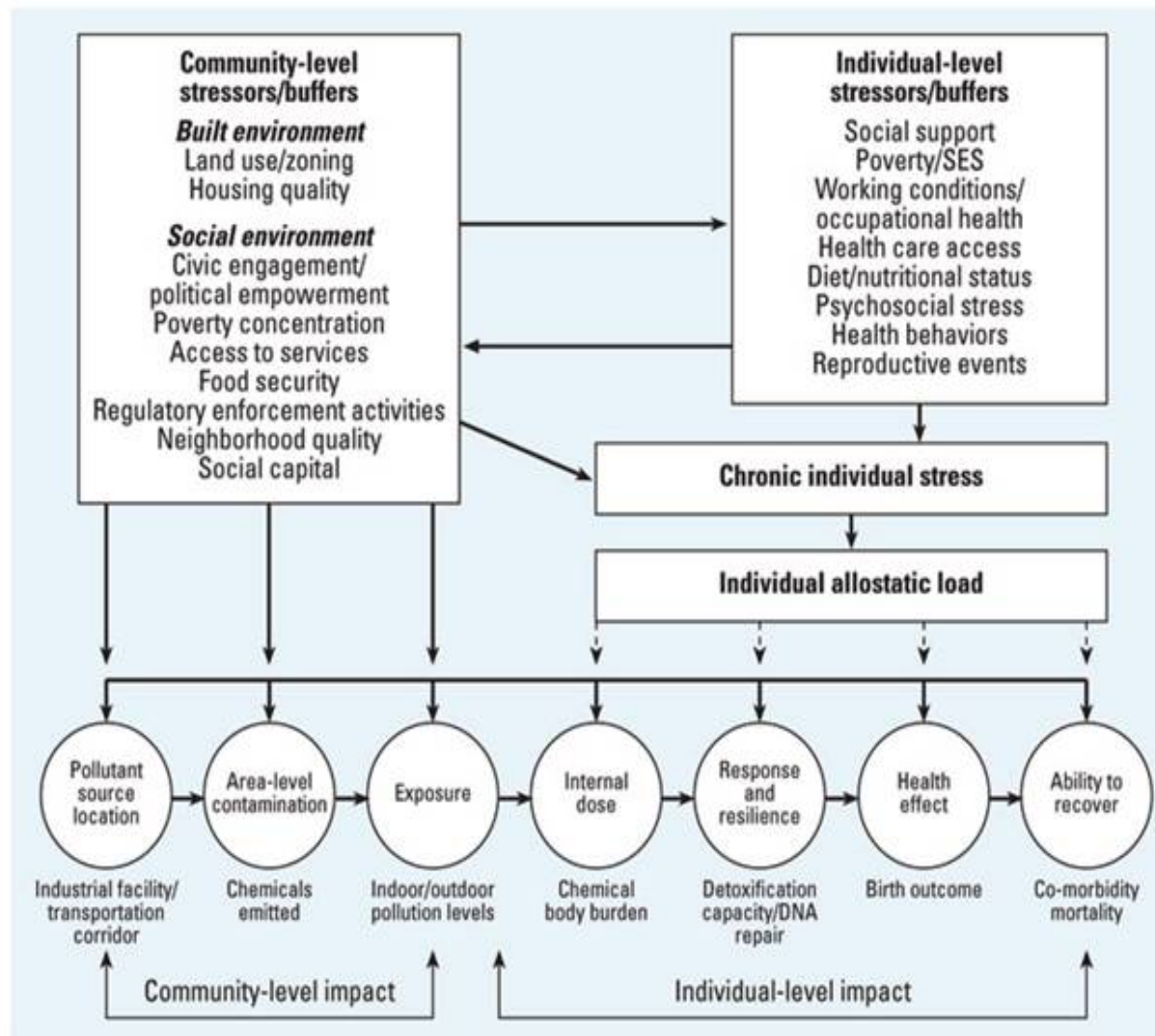


Figure 1. The interplay of community and individual stressors/buffers that shape exposures and susceptibility to environmental hazards. Thick arrows indicate relationships that have been studied in the epidemiologic and sociology literature; dashed arrows indicate relationships that have not been extensively explored.

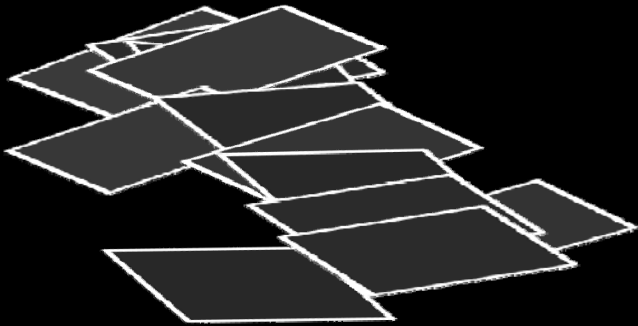
The Art of Visual Modeling

- ✓ Inclusion
- ✓ Ordering
- ✓ Connections

Labels

Health Behaviors
Structures
Stressors
Socio-Economic Status

Enclosures



Arrows

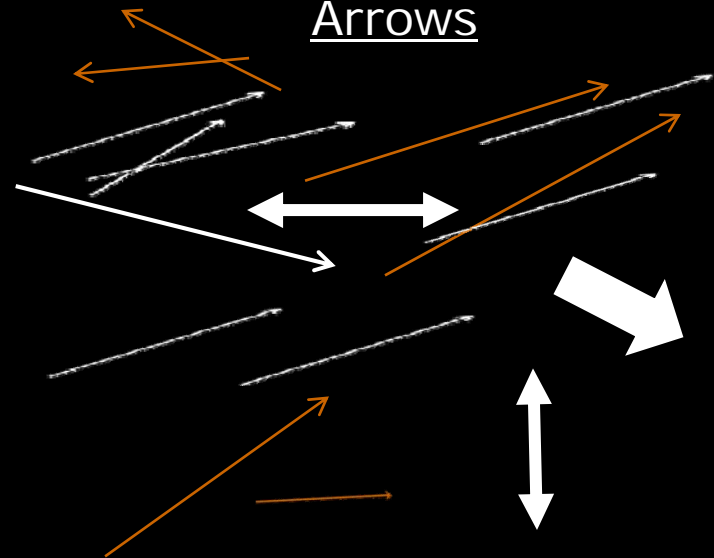


Figure 1: Social Determinants*

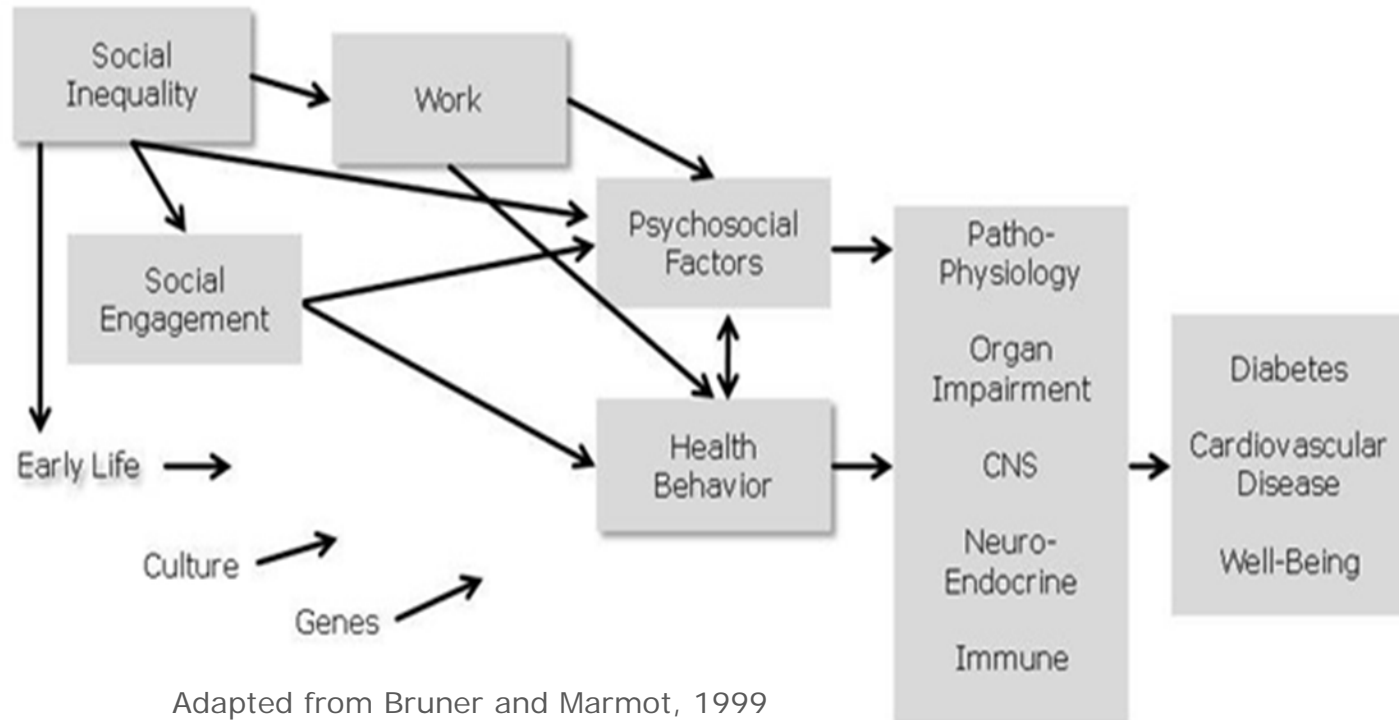
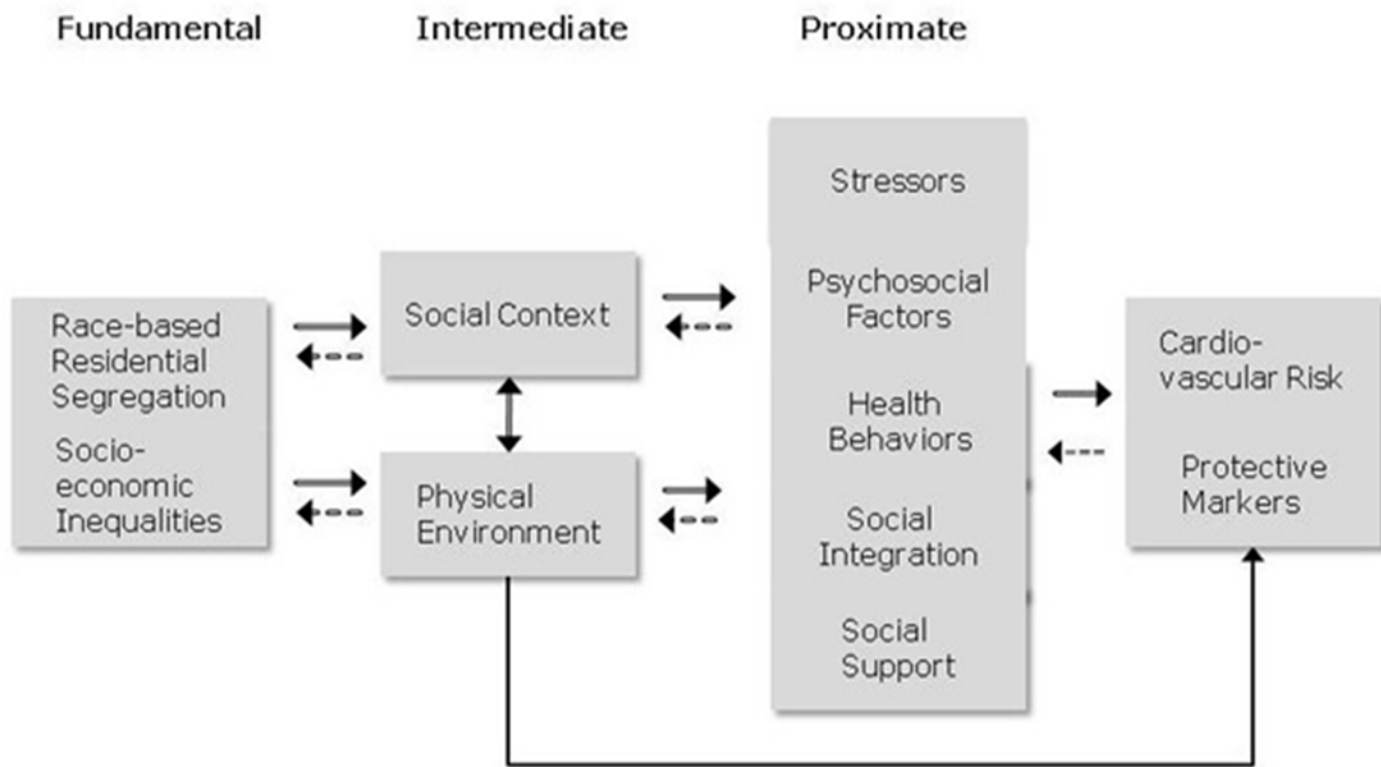
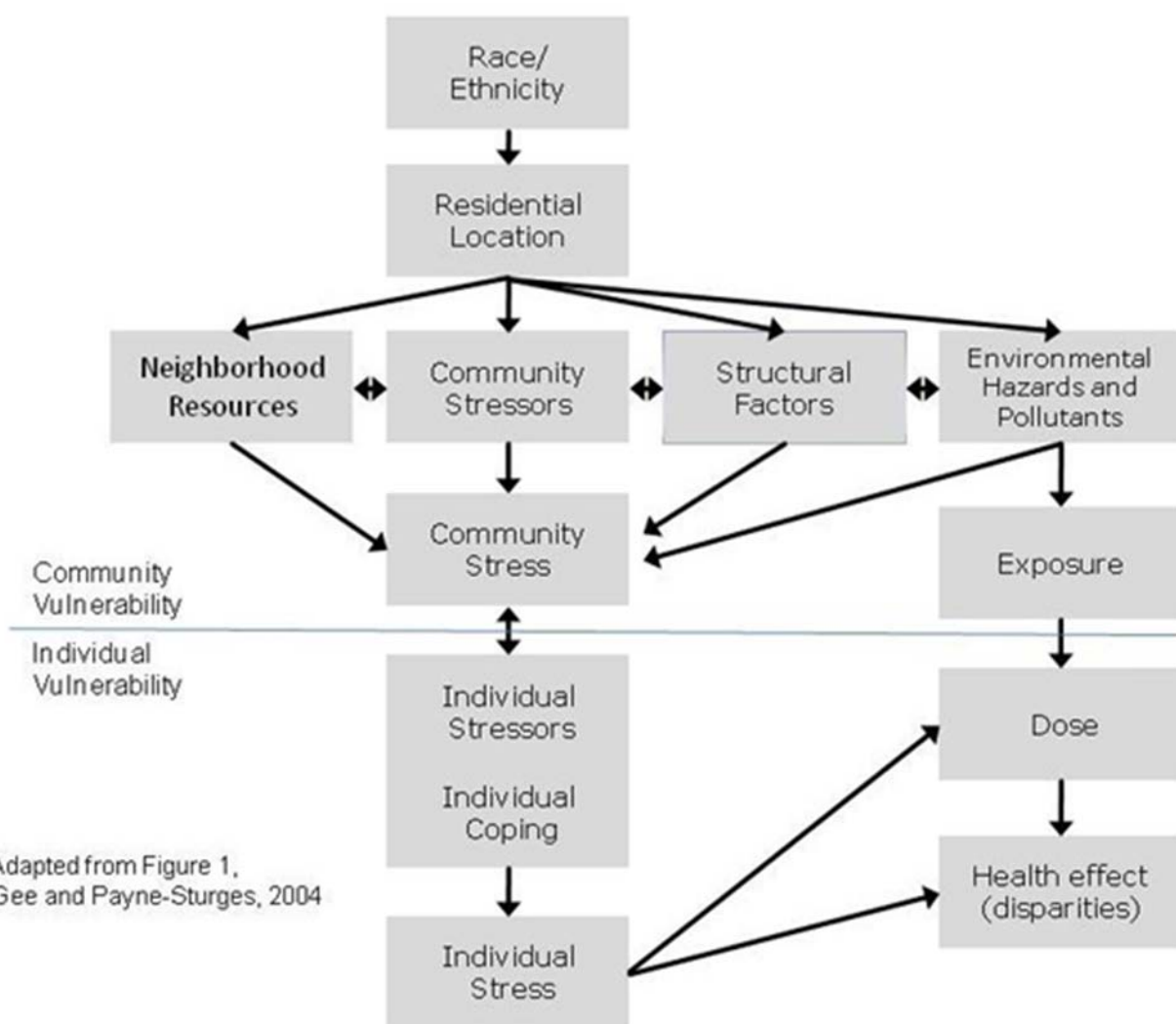


Figure 2: Health Disparities*



*Adapted from Figure 1, Schulz, et al., 2005

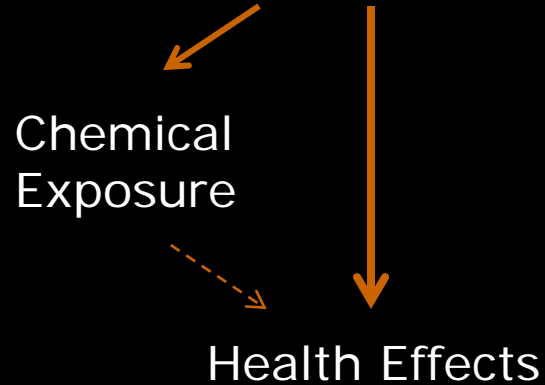
Figure 3: Multiple Stressors*



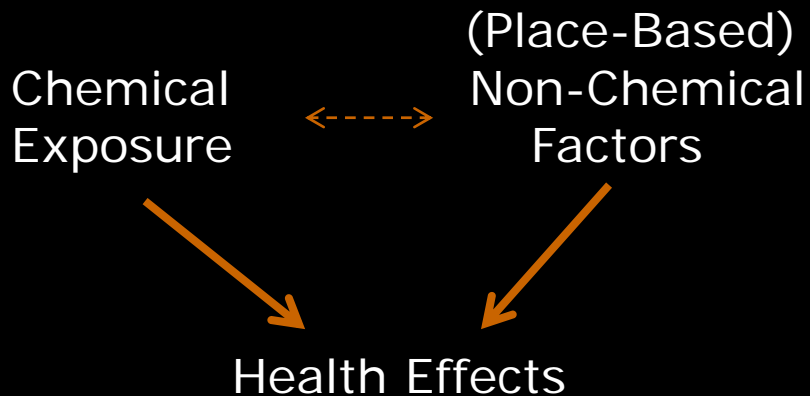
*Adapted from Figure 1,
Gee and Payne-Sturges, 2004

The Three Frameworks

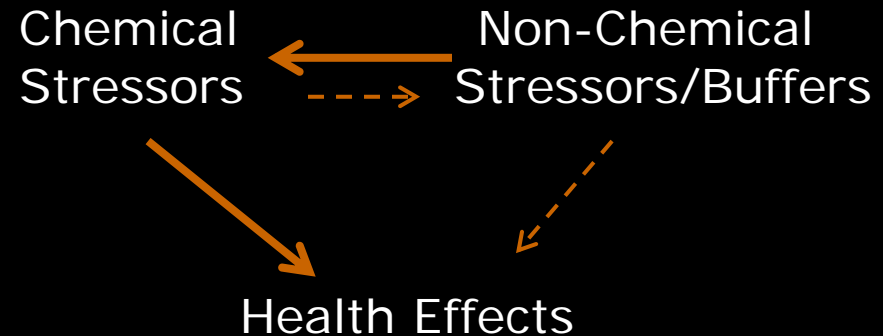
The SD Framework (Structural) Non-Chemical Factors



Health Disparities Framework



Multiple Stressors Framework



✓ Underdetermination

✓ Separability

✓ Testability

✓ A Priori Selection

What Comes Next?

References:

- Bruner E, and Marmot M, 1999. Social organization, stress, and health. In: "The Social Determinants of Health." Marmot M and Wilkinson R (Eds.). New York, NY: Oxford University Press.
- Gee GC, and Payne-Sturges DC, 2004. Environmental health disparities: a framework integrating psychosocial and environmental concepts. *Environ Health Perspect* **112(17)**:1645-1650.
- Schulz, AJ, Kannan S, Dvonch JT, Israel BA, Allen III A, James SA, House JS, and Lepkowski J, 2005. Social and physical environments and disparities in risk for cardiovascular disease: the healthy environments partnership conceptual model. *Environ Health Perspect* **113(12)**:1817-1825.