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SCHOOL OF MEDICINE

Stanford University Medical Center

THE “ENVIROME”: MEASURES FOR A LEARNING HEALTH SYSTEM

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Clinical Effectiveness Research Innovation
Collaborative

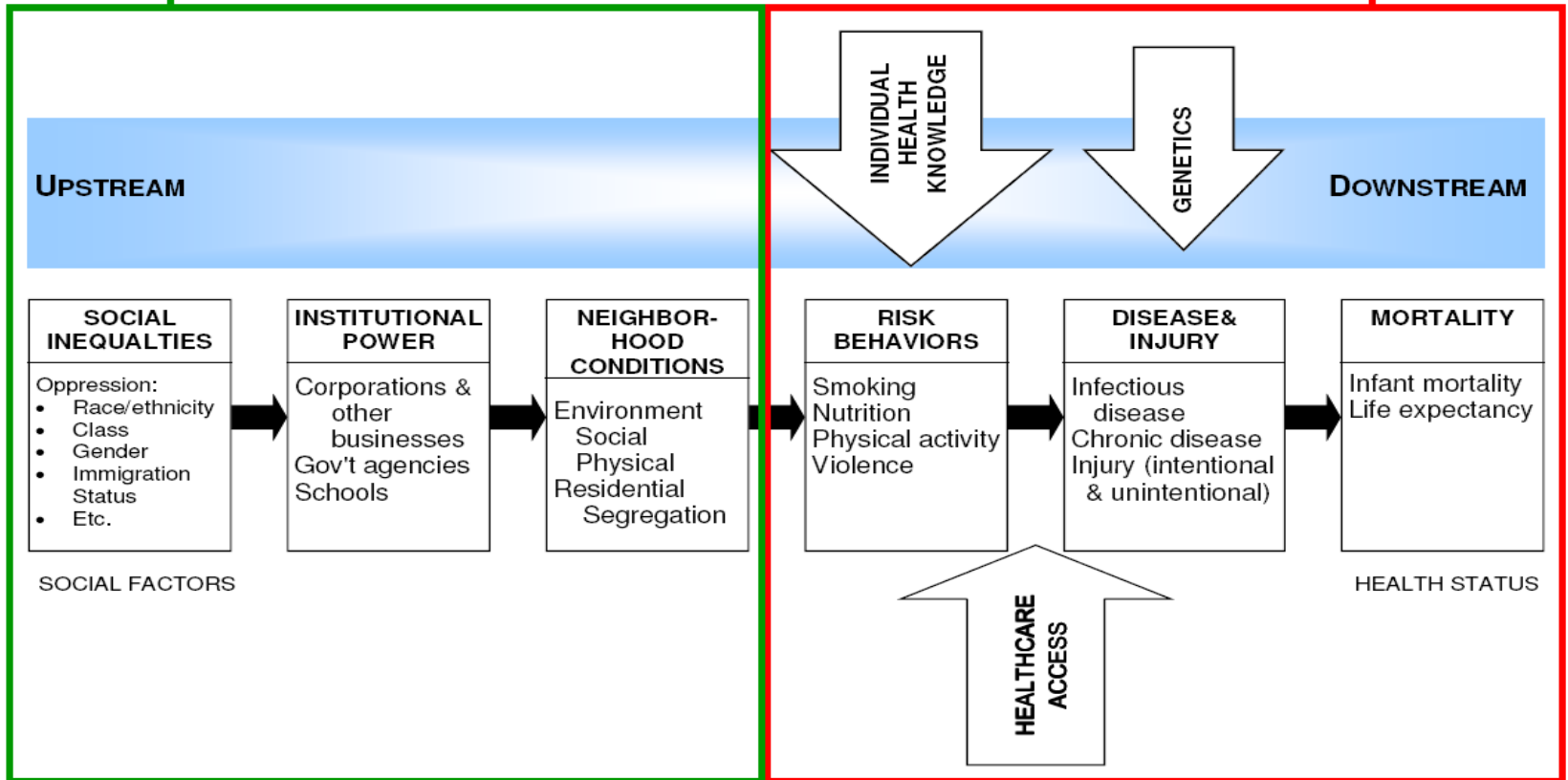
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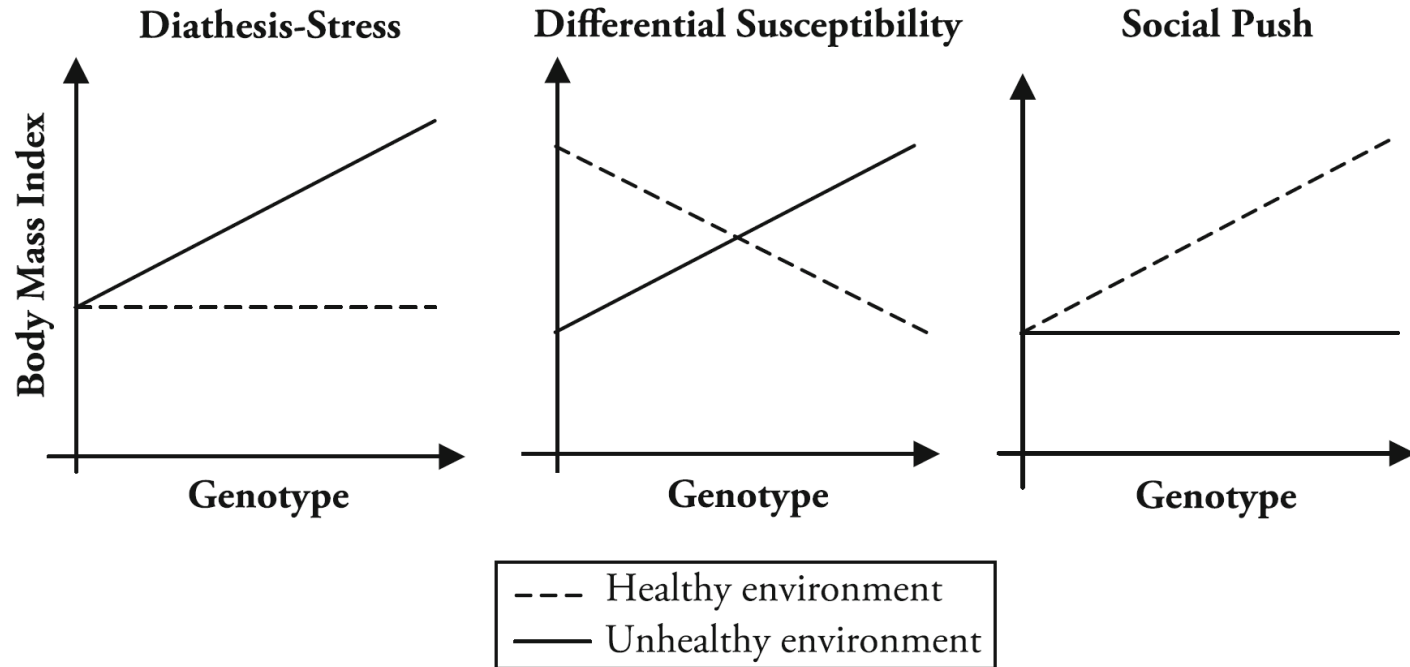
A Framework for Health Equity

Socio-Ecological

Medical Model



Gene-Environment Interaction Models after Boardman et al



The ENVIROME in categories

Exposure Category	Historic “Gold” Standard	Existing Technologies	Proposed or Imagined Technologies
Chemicals	Ambient environmental surveys and personal sampling devices (“pumps”)	Use of GC/MS and HPLC to measure agents or metabolites—one at a time-- in blood and urine	Multichannel detector technologies (chips)
Physical Exposures	External ambient measures, eg noise-meters	personal sampling devices such as the “fit bits”	Attachable/implantable “chips”?
Microbiota (GI etc)	Cultures	PCR-based arrays	
Dietary Constituents	Dietary questionnaires and Nutrient bioassays	Animal/vegetable miRNA detection--? scalability	Visual/electronic transduction tools eg google glasses
Psycho-social Stressors	Psychological test batteries/ survey instruments	Measures of HPA axis function in blood, urine and spit, HR variability measures etc	Telomere length/telomerase activity; methylation patterns at DNA/histone sites

Value Proposition

“Upstream” value

- Chemical environment
- Microbiome
- Early life psychosocial stressors

“Downstream” value

- (?) Chemicals (e.g. PM_{2.5})
- Diet
- (?) Microbiome
- Physical exposures
- Inter-current stressors