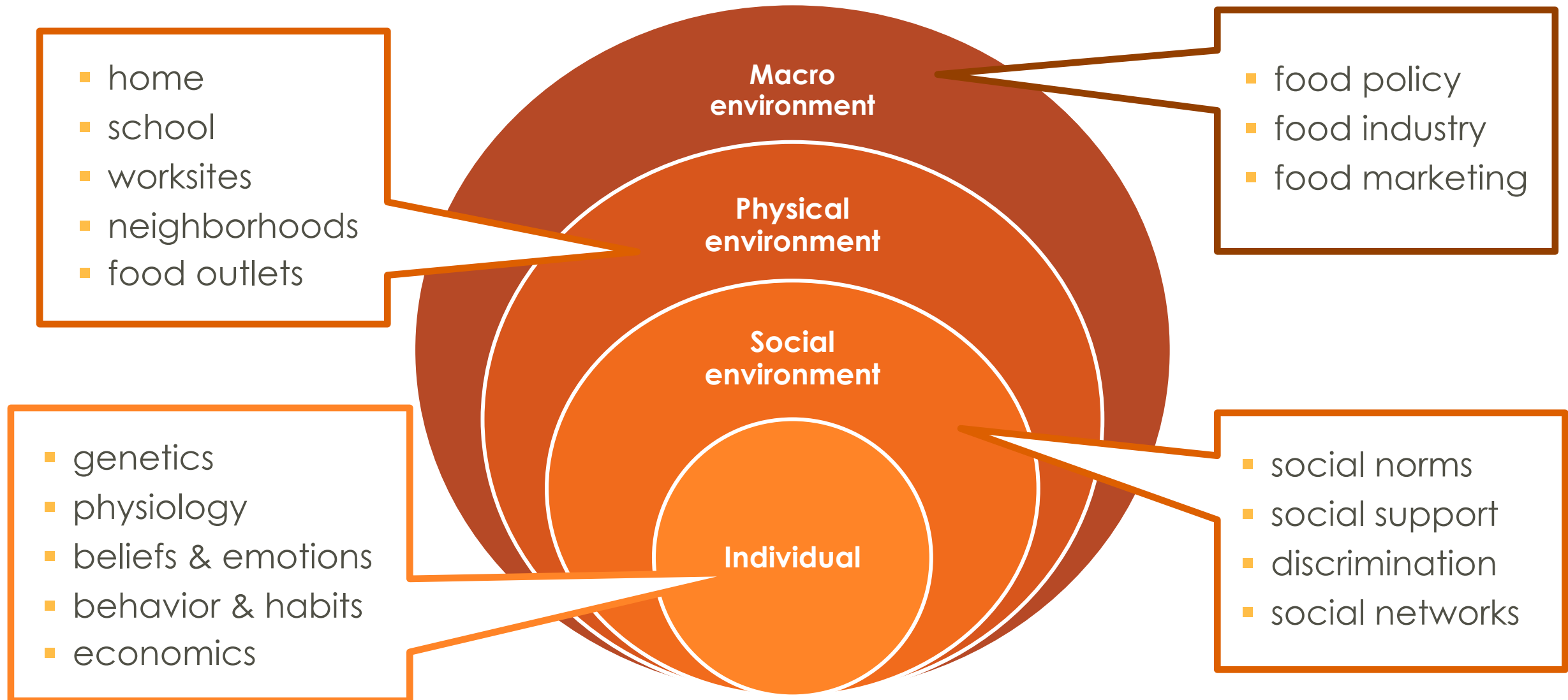


kayla de la haye & abigail horn

ai and data science in
public health nutrition



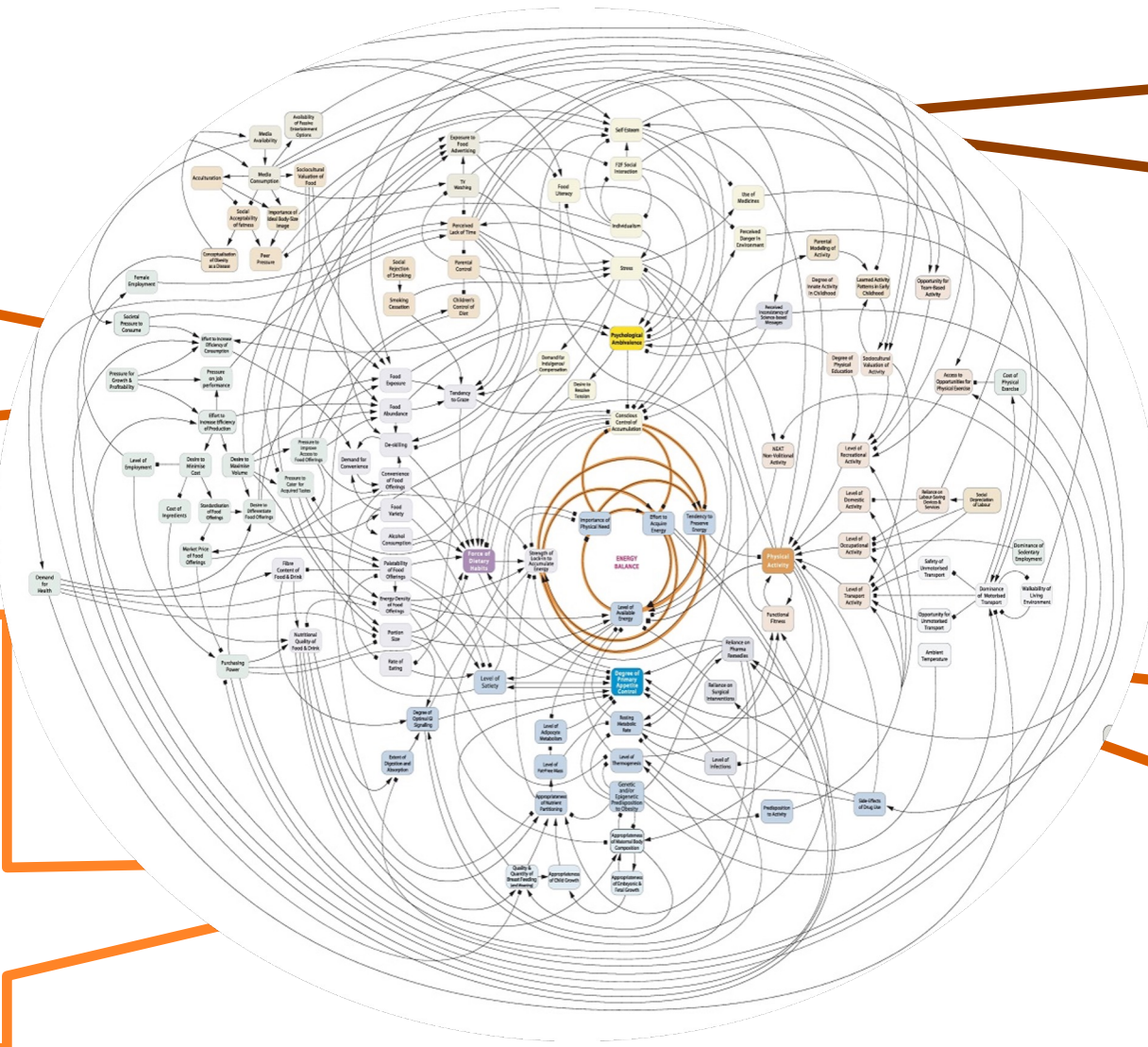
ecological model of eating



dynamic system model of eating

- home
- school
- worksites
- neighborhoods
- food outlets

- food policy
- food industry
- food marketing



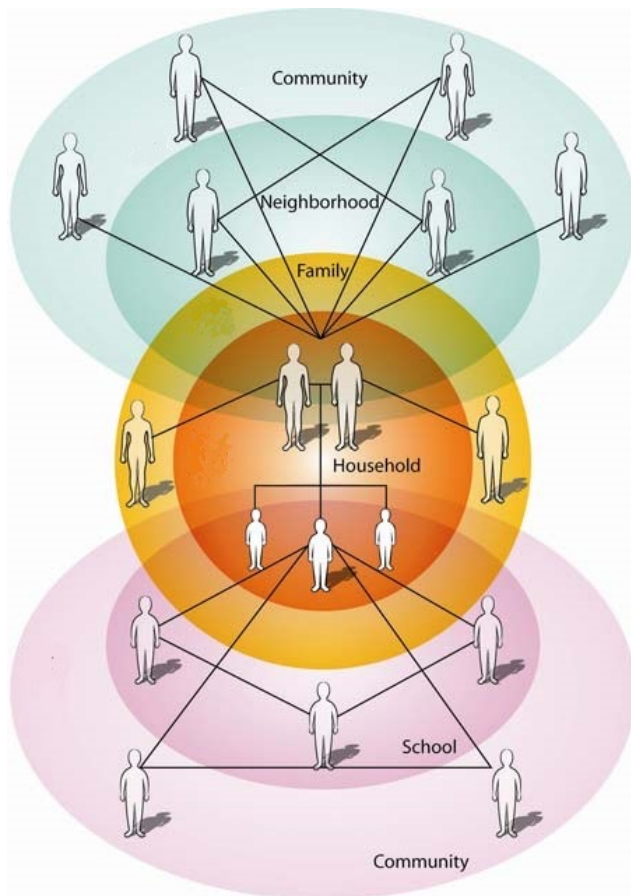
- genetics
- physiology
- beliefs & emotions
- behavior & habits
- economics

- social norms
- social support
- discrimination
- social networks

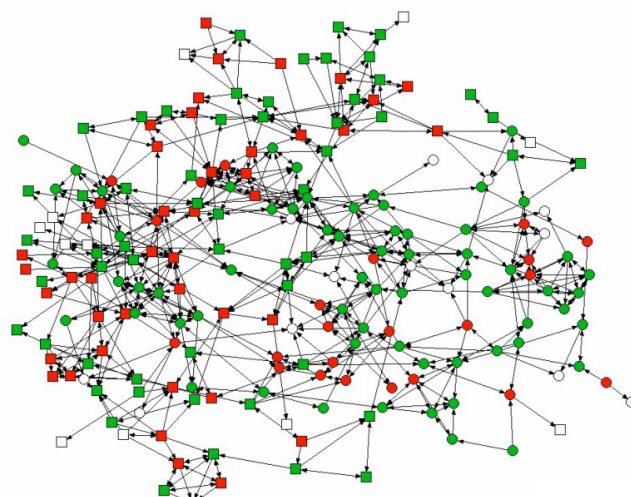
Social network analysis shows that nutritional health & social networks are interdependent

Social networks **form & evolve** based on (nutritional) health

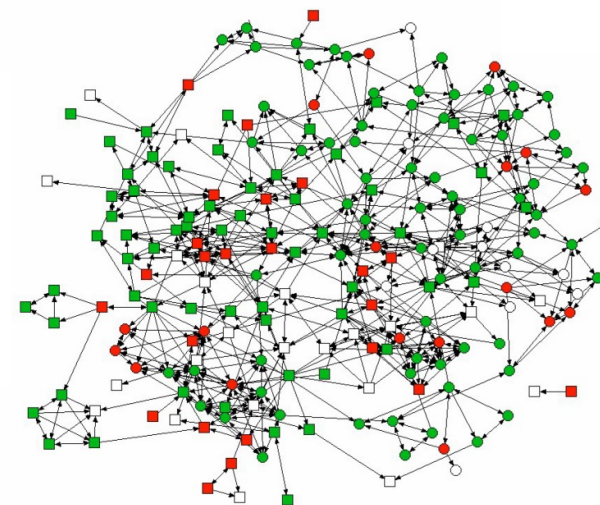
Social networks **influence** food access, food choice, eating and nutrition



Koehly & Loscalzo, 2009



Wave 1



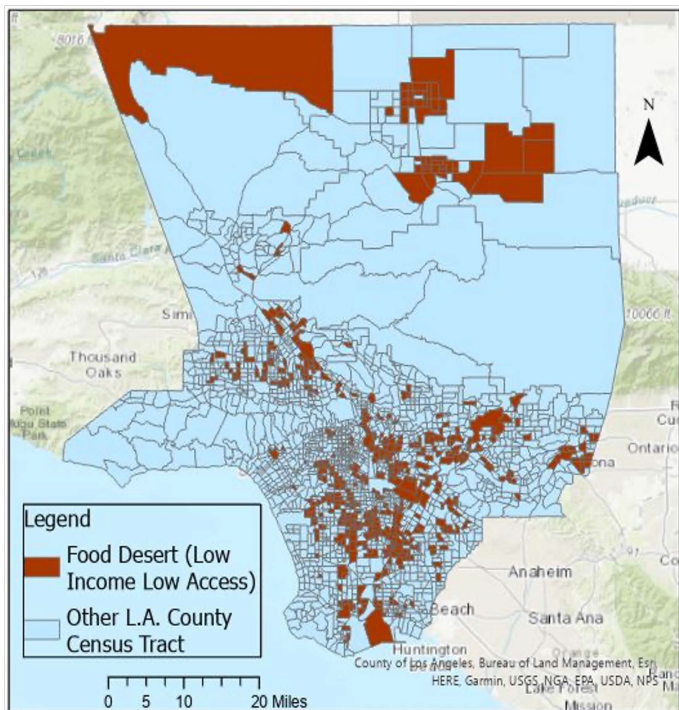
Wave 3

- low to moderate LNEd food intake
- highest LNEd food intake
- male
- female
- best friend nomination



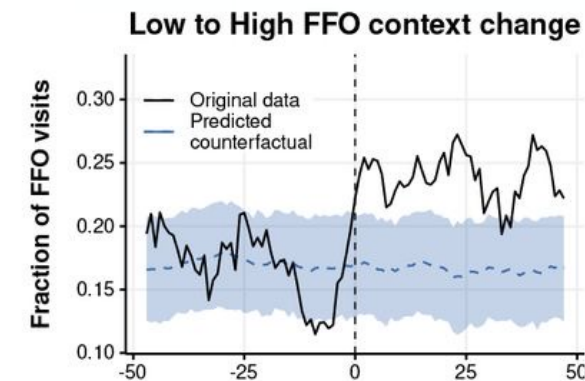
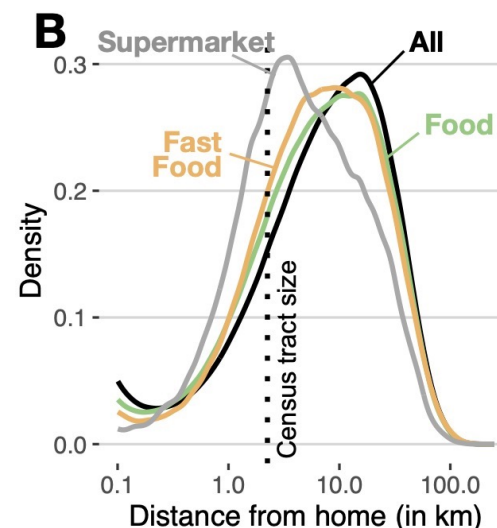
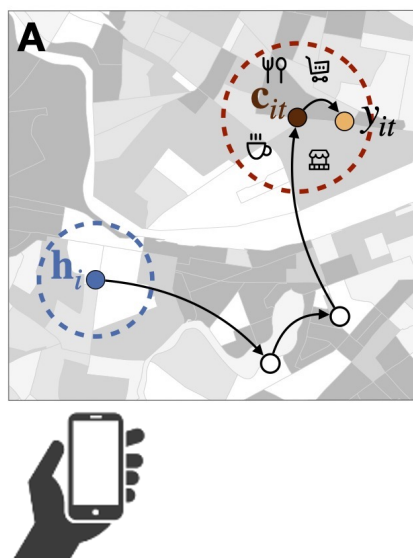
Mobility data provides valuable insight into “mobile” food environments and their impact on food choice

1 in 4 Los Angeles County residents live in a “food desert” (USDA, 2019)



Large-scale mobility data shows:

- food environment exposures and food outlet visits are often **>10km from home**
- the quality of **mobile** food environments impacts food choice



The nutritional quality of food outlets and environments can be better understood using **digital menu data**



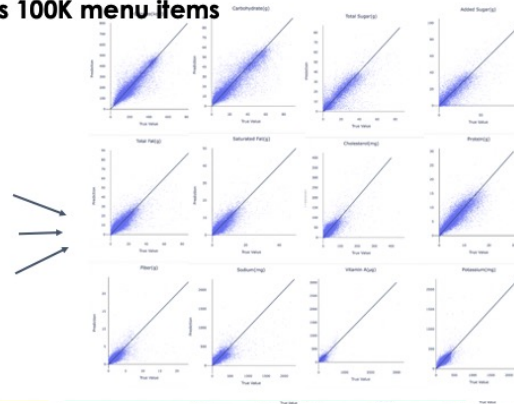
Input
Menu Item
Label



Algorithm predicts
20+ nutrient values
across 100K menu items

Prediction

- Calories
- Sugars
- Cholesterol
- Saturated Fat
- Sodium
- Protein
- Fiber
- Calcium
- Iron
- Vitamin A
- Vitamin C
- And more...



Low Nutritional Density	RRR score	Middle Nutritional Density	RRR score	High Nutritional Density	RRR score
Vanilla Creme Donut	0.16	Huevos Rancheros	1.17	Grilled Chicken Breast	2.15
Chips (1 oz)	0.62	Chicken Quesadilla	1.30	Black Beans & Rice	2.80
Five Cheese Tomato Pizza	0.71	Sauteed Steak	1.5	Mung Bean Salad	5.84

Low RNQ	RNQ score	Middle RNQ	RNQ score	High RNQ	RNQ score
Cold Stone Creamery	0.16	Subway	1.15	Sweetgreen	1.82
Buffalo Wild Wings	0.18	El Pollo Loco	1.18	Sansai Japanese Grill	1.86
McDonald's	0.34	District Taco	1.44	Veggie Patch	2.50

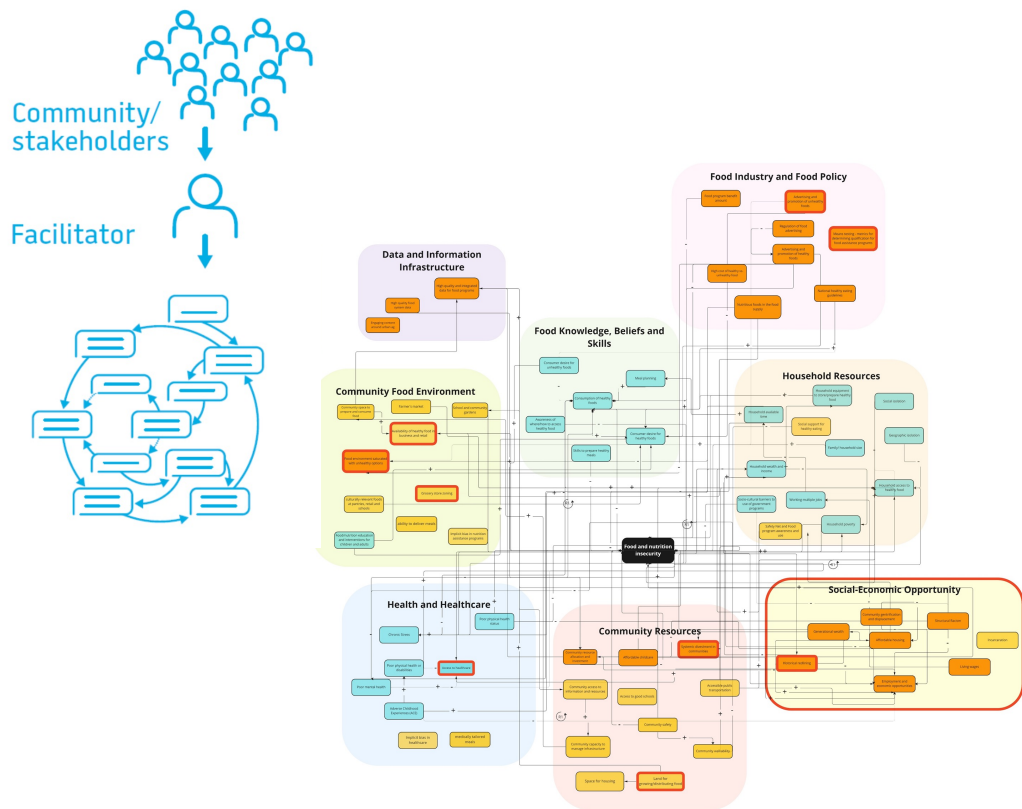


"most nutritious": Top 7% | RNQ > 1.3
 "least nutritious": Bottom 7% | RNQ < 0.3



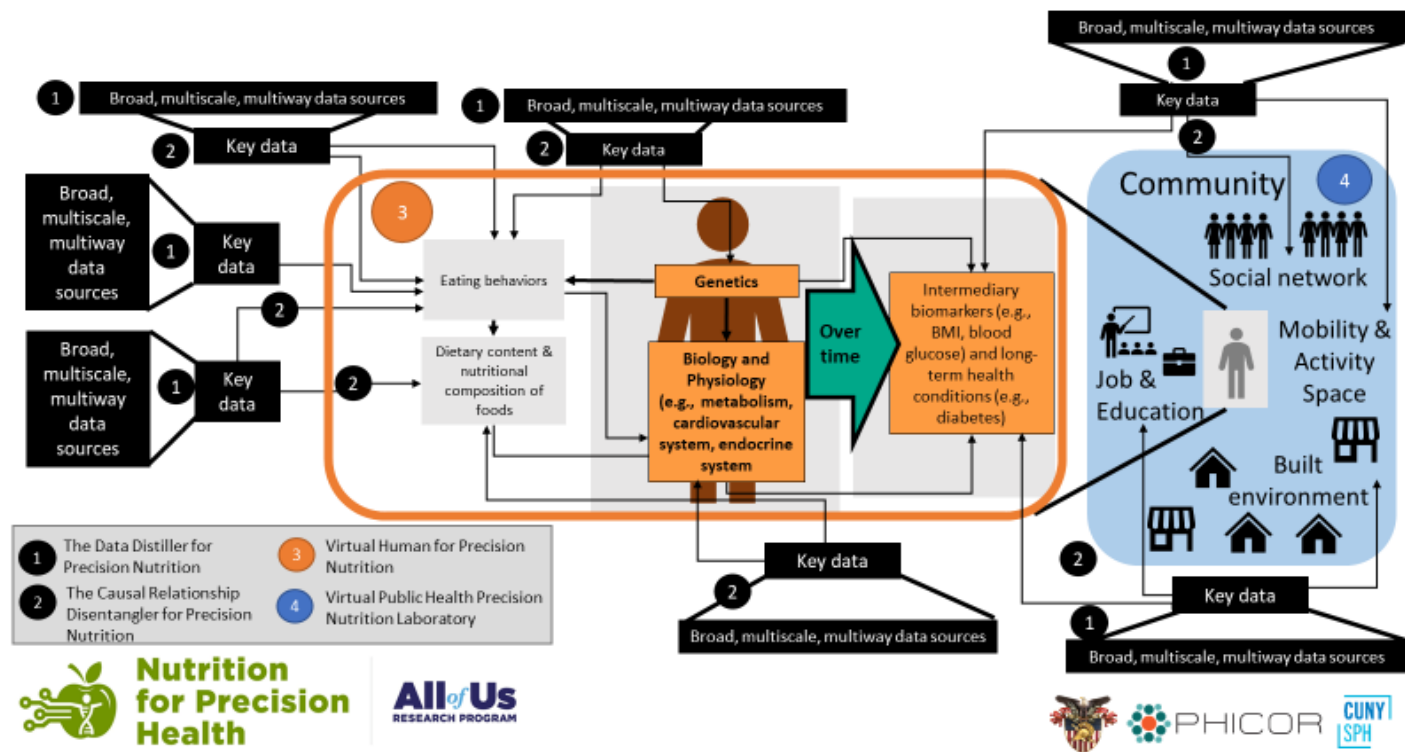
SOUTHERN CALIFORNIA
Center for Latino Health
A regional consortium based at Children's Hospital Los Angeles

Integrating novel food system data sources and insights to **map and monitor food systems** & **and build virtual labs**



Smart & Connected Community Food Systems:

K de la Haye (USC), J Wilson (USC), W Bruine de Bruin (USC), B Lee (CUNY), A Horn (USC)



NPH AI & Modeling Center (AIMINGS):

B. Lee (CUNY), S. Kleinberg (Stevens Institute), K de la Haye (USC), D. Thomas (West Point)