Neighborhood deprivation predicts diet quality at one year of age

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Background

- Diet quality in early childhood predicts diet and obesity status in adulthood[1]
- Diet-related health disparities are associated with socio-economic environment in children and adults[2]
- Little is known about neighborhood effect on infant diet patterns[3]
- The Deprivation Index[4] (**Figure 1**) summarizes census tract socioeconomic variables into a composite score
  - 0 = lowest neighborhood deprivation
  - 1 = highest neighborhood deprivation

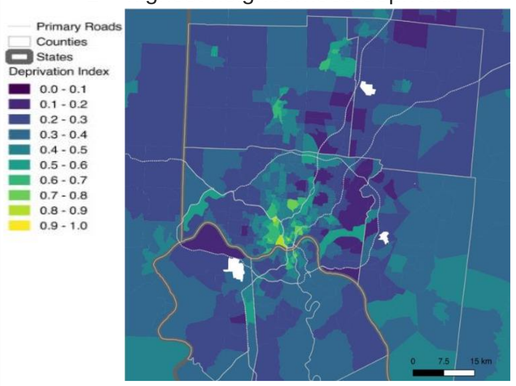

Figure 1. Deprivation index heatmap of Greater Cincinnati, OH[9]

Methods

The PREVAIL Cohort is an ongoing, CDC-sponsored, 2-year prospective birth cohort in Cincinnati, OH

Inclusion

- Delivery of healthy, term, singleton infant
- Live in greater Cincinnati
- Completion of 12-month food frequency questionnaire (*n*=154)

Data Collection

- Demographics, address, & socio-economic position data collected at baseline
- Addresses were geocoded[5] using DeGAUSS software, merged with Deprivation Index
- Breastfeeding initiation & duration collected during periodic clinic visits
- Food frequency questionnaire administered at 12-month clinic visit, estimated:
  - Servings/day of fruits & vegetables, sugar-sweetened beverages
  - Food groups/day (dietary diversity)

Results

Table 1: Study Demographics by Deprivation Index Quartile

Variable		Quartile 1 *n*=40	Quartile 2 *n*=37	Quartile 3 *n*=38	Quartile 4 *n*=39	*p*
Deprivation Index score	med (IQR)	0.24 (0.17, 0.29)	0.34 (0.30, 0.38)	0.46 (0.39, 0.56)	0.69 (0.57, 0.85)	
Maternal age	med (IQR)	32.0 (24.9, 39.1)	31.8 (20.1, 42.5)	29.6 (19.0, 40.7)	27.4 (19.0, 37.8)	0.006
Race	Black	6 (15%)	12 (32%)	19 (50%)	36 (92%)	<0.001
Income	<$25,000	3 (8%)	3 (8%)	15 (29%)	25 (64%)	<0.001
Maternal Education	≤High School	4 (10%)	9 (24%)	19 (50%)	36 (92%)	<0.001
Breastfeeding initiation	(% yes)	92.2%	94.6%	89.5%	74.4%	0.03

The Deprivation Index is a standardized, composite measure of six US Census tract variables (% of population without a high school diploma, without health insurance, accessing any social services, below the poverty level, census-tract median income and fraction of vacant housing) used to characterize neighborhood deprivation.

Figure 2: Infant Diet Quality by Deprivation Quartile

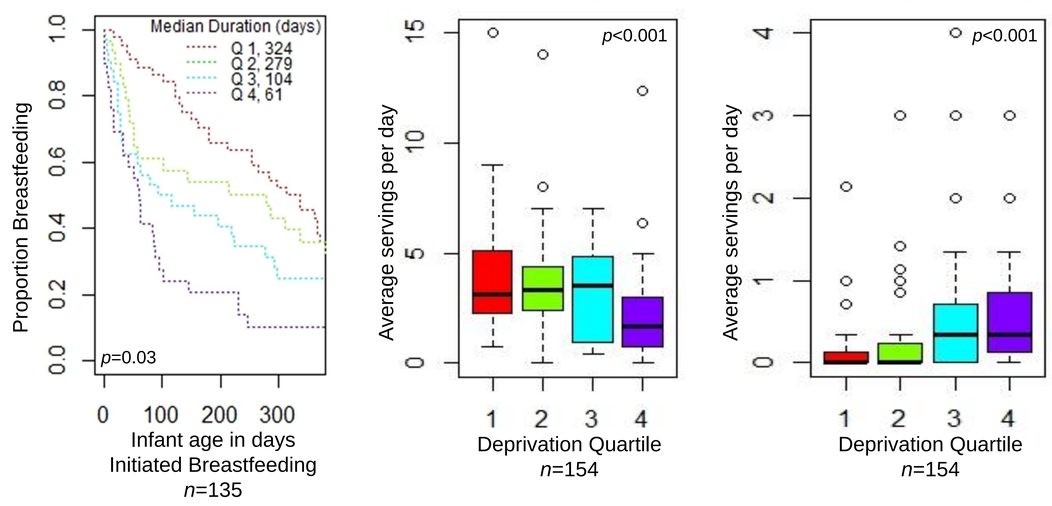

Table 2: Poisson Regression Models of Infant Diet Quality

	~Deprivation Index score		~Breastfeeding initiation	
Diet Quality Measure	**β**	**p**	**β**	**p**
Fruits & Vegetables*	-0.79	0.04	0.80	<0.001
Sugar-sweetened beverages*	-0.45	0.70	-0.41	0.20
Dietary Diversity score**	0.01	1.0	0.29	0.03

All models controlled for the covariates maternal age, maternal race, & maternal education level.
* Estimated number of servings per day
** Estimated number of food groups per day (fruits, vegetables, tubers, grains, meats, dairy, nuts/legumes)

Statistical Analysis

- Deprivation Index quartiles were calculated and assigned
- Medians: Kruskall-Wallis
- Proportions: Fisher's exact test
- Survival: Kaplan Meier, log likelihood
- Modeling: Poisson regression
  - Covariates selection: backwards stepwise regression
- All analysis performed using R statistical software[6]

Discussion

- Residing in low-income neighborhood associated with lower diet quality by multiple measures
- Understanding dietary predictors will help explain disparities in obesity & health in low-income populations[8]
- Nutrition support for low-income populations underused
  - Structural barriers (transportation, child-care) cited as reasons[7]
  - **Locating services within low-income communities could improve access, diet, diet-related health disparities**
- Dietary interventions should focus on breastfeeding promotion
- Future studies should examine diet longitudinally, consider anthropometrics
- Strengths
  - Cohort design
  - US Census-derived deprivation measure
- Limitations
  - Deprivation score for one time-point
  - No validated diet quality measure

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