# The Economics of Nutrition and Health Capital: A Comprehensive Evaluation of the Supplemental Nutrition Assistance Program (SNAP)

## Executive Summary

The Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program, represents the largest nutrition assistance initiative in the United States and a critical component of the social safety net. While its legislative mandate focuses on alleviating hunger and improving the purchasing power of low-income households, its impact on "health capital"—the accumulated stock of physiological health that determines longevity, productivity, and quality of life—has become a central subject of economic and public health inquiry. This report provides an exhaustive analysis of the literature regarding SNAP’s causal impact on nutrition quality, anthropometric outcomes, and metabolic health.

Synthesizing evidence from quasi-experimental designs, instrumental variable analyses, and biomarker data, this report argues that the relationship between SNAP and health capital is heterogeneous and methodology-dependent. The "gold standard" literature utilizing the program’s historical county-level rollout demonstrates that SNAP functions as a potent investment in early-life health capital, significantly reducing low birth weight and neonatal mortality, with benefits persisting into adulthood via reduced metabolic syndrome. Conversely, the literature on adult obesity and diet quality is fraught with selection bias. When controlled for unobservable characteristics, the purported positive link between SNAP and obesity largely vanishes, and in some intensive-margin analyses, higher benefits are associated with reduced Body Mass Index (BMI). However, the program’s ability to drive high dietary quality (as measured by the Healthy Eating Index) is constrained by the real value of benefits (purchasing power) relative to local food prices, behavioral responses to the benefit cycle, and the structural costs of a nutritious diet.

## 1. Introduction: The Dual Mandate of Food Security and Health Capital

The Supplemental Nutrition Assistance Program (SNAP) sits at the intersection of income support and public health intervention. With expenditures exceeding $74 billion annually and serving over 40 million Americans, SNAP acts as a near-cash transfer designed to bridge the gap between a household’s resources and the cost of a nutritious diet.1 The program’s economic architecture is based on the Thrifty Food Plan (TFP), a theoretical basket of goods that constitutes a minimal cost nutritious diet. Benefits are calculated by subtracting 30% of a household's net income (the expected family contribution) from the cost of the TFP.2

From a theoretical perspective, economists view SNAP through the lens of the health production function, where nutrient intake is an input into the production of "health capital".3 Unlike direct medical interventions, SNAP operates upstream, aiming to modify the consumption bundle of households. This creates a dual mandate: the immediate alleviation of food insecurity (a flow variable) and the long-term accumulation of health (a stock variable).

However, evaluating SNAP is notoriously difficult due to the "selection problem." Households that participate in SNAP are not a random sample of the low-income population; they are systematically more disadvantaged, facing greater economic instability, higher rates of depression, and fewer community resources than eligible non-participants.4 Consequently, simple comparisons of participants and non-participants typically yield a negative correlation between SNAP and health outcomes—participants often appear to have poorer diets and higher obesity rates. This report focuses on the body of literature that employs rigorous econometric techniques to overcome this bias and isolate the causal effect of the program.

### 1.1 The Theoretical Framework: Fungibility and Infra-marginality

A central tenet of the economic analysis of SNAP is the principle of fungibility. For "infra-marginal" households—those who would spend more on food than the value of the SNAP benefit even in the absence of the program—the benefit should theoretically act as a cash transfer.6 The economic model predicts that receiving $100 in SNAP benefits frees up $100 of cash income that can be spent on other goods (e.g., housing, medical care) or additional food.

This fungibility suggests that SNAP’s impact on health capital may operate through two distinct channels:

1. **The Nutrition Channel:** Direct increases in food quantity or quality.
2. **The Income Channel:** Released cash resources that reduce financial stress (allostatic load) or allow for the purchase of complementary health inputs (e.g., preventive care, medications).7

Empirical anomalies, such as the "cash-out puzzle"—where the marginal propensity to consume food (MPCF) from SNAP benefits (0.5–0.6) is significantly higher than from cash income (~0.1)—suggest that behavioral factors and mental accounting also play significant roles in how benefits translate into nutritional outcomes.6

## 2. Econometric Methodologies in SNAP Literature

The credibility of any finding regarding SNAP’s impact on health hinges on the identification strategy used to address endogeneity. The literature has evolved through several distinct methodological phases, each offering different insights into the measurement of health capital.

### 2.1 The County Rollout Design (The "Gold Standard")

The most robust evidence for the causal impact of SNAP comes from the program's historical introduction. Between 1961 and 1975, the Food Stamp Program (FSP) was rolled out county-by-county across the United States. This rollout was driven largely by administrative constraints and congressional politics rather than local economic conditions, creating a natural experiment.1

Researchers Almond, Hoynes, and Schanzenbach leveraged this variation to compare health outcomes of cohorts born in counties that had implemented the program to those born in counties that had not, effectively controlling for county and year fixed effects. This design allows for the isolation of "in utero" and early childhood exposure effects, providing the cleanest estimates of how nutritional support aids health capital formation.8 The primary advantage of this method is its immunity to the self-selection bias inherent in modern voluntary participation, as it measures the "Intent to Treat" (ITT) effect of the program's availability.

### 2.2 Instrumental Variables (IV) and Policy Variation

For studies focusing on contemporary adults where the rollout is no longer applicable, economists utilize state-level variations in program administration as instrumental variables. These instruments affect the *probability* of participation but do not theoretically affect health outcomes directly, satisfying the exclusion restriction.

Common instruments include:

* **Recertification Periods:** The length of time a household can receive benefits before reapplying. Shorter periods increase transaction costs, reducing participation among marginally eligible households.9
* **Biometric Requirements:** Mandates for fingerprinting, which increase stigma and time costs.9
* **Broad-Based Categorical Eligibility (BBCE):** State variations in asset limits and gross income thresholds.10

Studies employing these IV strategies, such as those by Gregory, Todd, and Ver Ploeg, generally find that correcting for selection bias shifts the estimated impact of SNAP from negative to neutral or positive.11 For example, IV estimates often show that SNAP participants consume fewer calories from sugar-sweetened beverages than OLS estimates would suggest, indicating that unobserved factors (like preferences or local food environments) drive the negative OLS results.12

### 2.3 The Intensive Margin Approach

A more recent methodological innovation involves examining the "intensive margin"—the effect of receiving *more* benefits rather than just participating. Almada and Tchernis introduced an identification strategy using the overlap between SNAP and the National School Lunch Program (NSLP). Since children in SNAP households automatically qualify for free school meals, the value of the SNAP benefit effectively increases for the adults in the household (who no longer need to allocate SNAP dollars to the child's lunch).13

By exploiting variation in the proportion of school-age children within a household, researchers can proxy for an exogenous increase in the per-adult benefit amount. This approach isolates the effect of relaxing the budget constraint on diet quality and BMI, distinct from the characteristics of the household that led them to join the program in the first place.14

### 2.4 Difference-in-Differences (DiD) and Event Studies

Researchers also utilize longitudinal data (e.g., NHANES, PSID) to track individuals as they enter and exit the program. By comparing changes in health outcomes for entrants against non-entrants with similar propensity scores, or by utilizing the sudden expansion of benefits (such as the 2009 ARRA stimulus), economists can estimate causal effects.15 These models are particularly useful for analyzing short-term consumption responses, such as the "food stamp cycle" of expenditure.17

**Table 1: Summary of Econometric Identification Strategies in SNAP Literature**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Methodology** | **Identification Source** | **Strengths** | **Limitations** | **Key Studies** |
| **County Rollout** | Staggered implementation (1961-1975) | Exogenous variation; estimates long-run causal effects. | Historical context may not perfectly match modern food environment. | Almond, Hoynes, Schanzenbach 3 |
| **Instrumental Variables (IV)** | State policy rules (Recertification, Fingerprinting) | Controls for contemporary selection bias; addresses endogeneity. | Validity depends on exclusion restriction; LATE may not apply to all. | Gregory et al. 2, Meyerhoefer 9 |
| **Intensive Margin** | Household composition (School lunch overlap) | Isolates income effect from participation effect; focuses on benefit adequacy. | Requires complex assumptions about intra-household resource allocation. | Almada & Tchernis 13 |
| **Sibling/Family Fixed Effects** | Variation within families | Controls for shared genetic/environmental background. | Requires variation in participation within families; smaller sample sizes. | Anderson et al. 18 |

## 3. The Formation of Health Capital: In Utero and Early Childhood

The literature on fetal origins and early childhood posits that nutritional shocks during critical developmental windows can permanently alter physiological trajectories. This "biological programming" suggests that SNAP’s most profound impacts on health capital occur before birth.

### 3.1 Birth Weight and Neonatal Outcomes

Birth weight is the most widely used proxy for the initial stock of health capital. Low birth weight (LBW, <2,500g) and very low birth weight (VLBW, <1,500g) are robust predictors of infant mortality, cognitive delays, and adult chronic disease.19

Using the county rollout design, Almond, Hoynes, and Schanzenbach found that access to Food Stamps during the third trimester of pregnancy had a significant positive impact on birth outcomes. Specifically:

* **Reduction in Low Birth Weight:** The introduction of the program reduced the incidence of LBW by approximately 7% for Whites and between 5% and 11% for African Americans.20
* **Distributional Effects:** The impact was most pronounced at the lowest tail of the birth weight distribution, suggesting the program is most effective for the most vulnerable fetuses.15
* **Mechanism:** The third trimester is the period of rapid fetal weight gain. The income transfer provided by SNAP likely improved maternal nutrition (caloric and protein intake) precisely when it was most needed to support fetal growth.21

These findings are corroborated by contemporary studies linking WIC and SNAP participation. For instance, Bitler and Currie note that WIC participation (often overlapping with SNAP) is associated with reduced probability of being small for gestational age, although separating the distinct effects of the two programs remains econometrically challenging.22

### 3.2 Long-Run Impacts and Metabolic Imprinting

The health capital benefits of early exposure extend decades into the future. Hoynes, Schanzenbach, and Almond (2016) utilized the rollout variation to track cohorts into adulthood using the Panel Study of Income Dynamics (PSID). They found that individuals with access to SNAP in utero and during early childhood exhibited significantly better metabolic health in adulthood.8

Specific long-run outcomes included:

* **Metabolic Syndrome:** A reduction in a composite index of metabolic syndrome (obesity, high blood pressure, diabetes).
* **Economic Self-Sufficiency:** Increased economic self-sufficiency among women, suggesting that early health capital translates into human capital (education and earnings).8

This literature fundamentally reframes SNAP from a short-term anti-hunger program to a long-term human capital investment program. The "return on investment" includes not just immediate poverty alleviation but avoided health care costs and increased tax revenue from higher adult productivity.

## 4. Anthropometric Outcomes: The Obesity Paradox

While the evidence for birth outcomes is positive, the relationship between SNAP and adult obesity is one of the most contentious topics in the literature. Early cross-sectional studies frequently identified a "SNAP-Obesity Paradox," particularly among women, where participants had higher BMIs than non-participants. However, as identification strategies have improved, this relationship has been re-evaluated.

### 4.1 Deconstructing the Correlation

Naive regressions consistently show a positive correlation between SNAP participation and Body Mass Index (BMI).

* **Measurement:** BMI is calculated as weight ($kg$) / height ($m^2$). In children, BMI z-scores (standard deviations from the mean for age and sex) are used.25
* **The Paradox:** Why would a food assistance program cause obesity? Hypotheses included the consumption of cheap, calorie-dense foods, the "cycle" of binge eating after benefit receipt, or a simple income effect leading to overconsumption.17

However, these correlations fail to account for negative selection. Individuals who enroll in SNAP are often in the midst of economic crises that are independently associated with stress, poor sleep, and chaotic eating patterns—all drivers of weight gain.9

### 4.2 Causal Findings from Instrumental Variables

When researchers employ instrumental variables to address this selection, the obesity findings often change direction.

* **Baum (2007/2011):** Using fixed effects in longitudinal data (NLSY), Baum initially found positive effects on obesity for women. However, subsequent work utilizing more robust controls and dynamic models has tempered these conclusions, suggesting the effects are small or statistically insignificant.9
* **Meyerhoefer and Pylypchuk (2008):** Using state-level instruments, they found that SNAP participation actually *reduced* the probability of being underweight for women and did not significantly increase the probability of being obese. This suggests SNAP helps normalize weight rather than drive it to pathological excess.9

### 4.3 The Intensive Margin and Budget Constraints

The most nuanced understanding comes from intensive margin analyses. Almada and Tchernis (2018) found that for adults in households with children, an exogenous *increase* in SNAP benefits (via the school lunch proxy) led to a **reduction** in BMI.13

**The Mechanism:**

1. **Budget Constraint Relaxation:** With low benefits, households maximize calories per dollar, purchasing energy-dense, nutrient-poor foods (refined grains, added sugars, oils).
2. **Quality Substitution:** As benefits increase, the shadow price of a healthy diet becomes manageable. Households substitute quality for quantity, purchasing leaner proteins and produce, which helps regulate weight.14
3. **Stress Reduction:** Higher benefits reduce the cognitive load and cortisol associated with food insecurity, which is physiologically linked to abdominal fat storage.28

This "intensive margin" finding is critical for policy, as it suggests that the *adequacy* of the benefit is a determinant of health outcomes. Low benefits may trap recipients in an obesity-inducing food environment, while adequate benefits may enable healthier choices.

### 4.4 Childhood Obesity

The evidence on childhood obesity is similarly mixed but leans towards null effects in causal models.

* **Frisvold (2015):** Using microsimulation models and difference-in-differences, Frisvold explored the impact of food assistance. While some associations exist, controlling for the school environment and other transfers often renders the specific SNAP impact on BMI z-scores insignificant or small.29
* **Kreider et al. (2012):** Utilizing partial identification bounds to account for classification error (misreporting of participation), they found that SNAP participation reduced the prevalence of obesity in children, contradicting naive OLS estimates.9

## 5. Nutritional Quality and Dietary Composition

Beyond weight status, the composition of the diet—macronutrients and micronutrients—is a direct measure of nutrition quality. The primary metric used in this domain is the Healthy Eating Index (HEI).

### 5.1 The Healthy Eating Index (HEI)

The HEI (versions 2005, 2010, 2015) measures conformity to the Dietary Guidelines for Americans. It scores diets on a 0-100 scale based on the density of food groups (e.g., cups of fruit per 1,000 kcal).

* **Adequacy Components:** Fruits, vegetables, grains, dairy, protein (higher intake = higher score).
* **Moderation Components:** Refined grains, sodium, added sugars, saturated fats (lower intake = higher score).4

**Empirical Findings:**

* **The Gap:** SNAP participants consistently score lower on the HEI (mean ~47-52) compared to income-eligible non-participants and higher-income individuals (mean ~58-60).4
* **Decomposition:** Singleton et al. (2020) used Oaxaca-Blinder decomposition to analyze this gap. They found that socio-demographic factors (education, race/ethnicity, income depth) explain between 36% and 72% of the difference in diet quality. This implies that the "SNAP effect" is largely a "poverty effect".4
* **Specific Components:** The deficit is largely driven by lower consumption of whole fruits, dark green vegetables, and seafood/plant proteins, and higher consumption of empty calories.32

### 5.2 Sugar-Sweetened Beverages (SSB)

A focal point of policy debate is the consumption of SSBs. Critics argue SNAP subsidizes soda consumption.

* **Consumption Data:** Bivariate analyses show SNAP participants consume more calories from SSBs (~210 kcal/day) compared to ineligible adults (~175 kcal/day).33
* **Causal Reassessment:** Todd and Ver Ploeg (2014) applied IV methods to NHANES data. They found that after correcting for selection, SNAP participation was associated with a *reduction* or no significant difference in SSB calories compared to eligible non-participants.12
* **Interpretation:** High SSB consumption appears to be a function of low income and the relative price of calories rather than a specific program effect. The "treat" hypothesis suggests that for credit-constrained households, SSBs offer an affordable luxury, a behavior not unique to SNAP participants but prevalent among low-income groups generally.

### 5.3 Food at Home (FAH) vs. Food Away From Home (FAFH)

SNAP benefits can generally only be used for Food at Home (FAH).

* **Diet Quality Differential:** Research using the Food Acquisition and Purchase Survey (FoodAPS) indicates that FAH acquisitions have significantly higher HEI scores than FAFH acquisitions. By constraining spending to the FAH sector, SNAP theoretically supports better nutrition than an unconditional cash transfer that might be spent on fast food.32
* **Behavioral Shift:** However, because money is fungible, households may use SNAP for their grocery budget and redirect freed-up cash to FAFH, partially offsetting the nutritional gain.

**Table 2: Healthy Eating Index (HEI-2010) Scores by SNAP Status (Mean Values)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Group** | **Total HEI Score** | **Fruit Component** | **Vegetable Component** | **Empty Calories Component** |
| **SNAP Participants** | 47.1 | Low | Low | Low Score (High Intake) |
| **Eligible Non-Participants** | 49.9 | Moderate | Moderate | Moderate |
| **Ineligible (Higher Income)** | 58.0+ | High | High | High Score (Lower Intake) |
| Source: Derived from Singleton et al. 4 and Mancino et al. 32 |  |  |  |  |

## 6. Behavioral Economics and Purchasing Patterns

Understanding *how* SNAP recipients interact with the food market requires analyzing purchasing behaviors using scanner data (e.g., Nielsen Homescan, IRI).

### 6.1 The "Cash-Out Puzzle" and Mental Accounting

Standard theory suggests an MPCF of ~0.1 for cash. However, empirical estimates for SNAP often place the MPCF between 0.5 and 0.6.6

* **Mental Accounting:** Households appear to treat SNAP benefits as a distinct "food account," spending more on food than they would if given cash.
* **Hastings and Shapiro (2018):** Analyzing retailer data, they found that this high MPCF does not necessarily translate to higher nutritional quality. Instead, households often treat SNAP funds as less "painful" to spend, leading to a reduction in shopping effort.
  + **Coupon Usage:** SNAP households redeem fewer coupons upon benefit receipt.
  + **Store Brands:** There is a substitution toward store-brand products, but also a relaxation of the search for the absolute lowest price.6

### 6.2 The "Food Stamp Cycle"

Benefits are typically disbursed once a month. This creates a "boom and bust" cycle of consumption.

* **Expenditure Curve:** Spending peaks dramatically in the first 3 days after receipt and tapers off.
* **Nutritional Consequence:** Households often purchase perishables (meats, fresh produce) early in the month. As the month progresses and benefits dwindle, they switch to shelf-stable, cheaper, and often less healthy foods (starches, processed goods) to maintain caloric sufficiency.17
* **Physiological Impact:** This caloric cycling can lead to metabolic stress, including hypoglycemia and insulin spikes, which are particularly detrimental for diabetics.38

## 7. The Role of Prices and Purchasing Power

A major structural limitation of SNAP is that benefit levels are fixed nationally (based on the TFP), while food prices vary significantly by geography.

### 7.1 Geographic Price Variation and Real Benefits

Bronchetti, Christensen, and Hoynes (2019) investigated the "real" value of SNAP by constructing a purchasing power measure:

$$\text{Purchasing Power} = \ln\left(\frac{\text{SNAP}\_{max}}{\text{TFP}\_{local}}\right)$$

Where $\text{TFP}\_{local}$ is the cost of the Thrifty Food Plan in the household's specific market group (30 regions in the US).2

**Findings:**

* **Health Trade-offs:** In high-cost areas (low purchasing power), SNAP households are forced to make difficult trade-offs. The study found that lower purchasing power is associated with reduced utilization of children's preventive health care and increased school absences due to illness.39
* **Mechanism:** When food prices are high relative to the benefit, households may divert cash resources away from medical copays or transport to doctors to supplement their food budget, or they may substitute toward cheaper, less healthy food options that degrade immune function over time.

### 7.2 The Thrifty Food Plan (TFP) Adequacy

The TFP assumes that households can prepare all meals from scratch (e.g., soaking dried beans, cooking raw rice). This ignores the time poverty of low-income working households.

* **Time vs. Money:** To achieve the TFP diet within the cost limit requires substantial time inputs for preparation. When households lack this time, they must purchase prepared foods (which are often disallowed or more expensive) or convenience foods (which are less healthy).
* **Real Cost:** Estimates suggest that the "true" cost of a TFP-compliant diet, when accounting for preparation time and palatability, is significantly higher than the allotment, creating a structural barrier to High HEI scores.2

## 8. Biomarkers and Metabolic Health

To bypass the limitations of self-reported dietary data, recent economic literature leverages biomarkers available in the National Health and Nutrition Examination Survey (NHANES).

### 8.1 Metabolic Syndrome and HbA1c

Metabolic syndrome is a cluster of conditions (high blood pressure, high blood sugar, excess body fat, abnormal cholesterol) that increases heart disease risk.

* **Prevalence:** SNAP participants have a significantly higher prevalence of metabolic syndrome (45.3%) compared to non-participants.42
* **Glycemic Control (HbA1c):** HbA1c measures average blood sugar over 3 months. Research indicates that food insecurity is associated with higher HbA1c. While SNAP mitigates food insecurity, the monthly benefit cycle can disrupt glycemic control for diabetics, leading to higher admissions for hypoglycemia at the end of the month.38
* **Causal Evidence:** Despite cross-sectional correlations with poor health, the *long-run* rollout evidence suggests that childhood SNAP access reduces the likelihood of metabolic syndrome in adulthood. This implies that the current high prevalence among participants is a reflection of their poverty and accumulated disadvantage, while the program itself exerts a protective, albeit slow-acting, effect.24

### 8.2 Inflammation and Allostatic Load

Poverty is associated with chronic inflammation (e.g., elevated C-reactive protein). This "allostatic load" is a biological measure of stress.

* **Stress Reduction:** By stabilizing food access, SNAP theoretically reduces the cortisol spikes associated with food insecurity. While direct causal evidence on CRP is emerging, the logic follows that reducing resource uncertainty preserves health capital by lowering the biological toll of stress.44

## 9. Policy Interventions and Future Directions

Given the mixed evidence on diet quality, policymakers have proposed various modifications to the program.

### 9.1 Incentives vs. Restrictions

* **Healthy Incentives (HIP/FINI):** Pilots that provide a matching subsidy (e.g., 30 cents on the dollar) for fruit and vegetable purchases have shown success. The Healthy Incentives Pilot (HIP) increased fruit and vegetable consumption by 26%, demonstrating that price elasticity for healthy foods is significant among SNAP recipients.46
* **Restrictions (SSB Bans):** Proposals to ban the purchase of SSBs with SNAP benefits are controversial. Economic analysis suggests that because money is fungible, such bans might not reduce total SSB consumption (households would just use cash for soda), but would increase stigma and transaction costs.48

### 9.2 Improving Purchasing Power

The evidence from Bronchetti et al. suggests that geographically adjusting SNAP benefits to reflect local food prices—similar to how housing vouchers are adjusted—would significantly improve health outcomes and reduce food insecurity in high-cost urban areas.39

## 10. Conclusion

The evaluation of SNAP’s impact on nutrition and health capital reveals a complex picture where methodology determines the conclusion. Naive comparisons suggest the program is associated with poor diet and obesity. However, rigorous economic analysis utilizing quasi-experimental designs and biomarker data supports a different narrative:

1. **Health Capital Formation:** SNAP is a highly effective investment in early-life health capital. Exposure in utero and early childhood causally reduces low birth weight and neonatal mortality, and lowers the risk of metabolic syndrome in adulthood.
2. **Obesity and BMI:** Correcting for selection bias eliminates the positive causal link between SNAP and adult obesity. At the intensive margin, adequate benefits appear to facilitate weight management by allowing households to substitute away from cheap, energy-dense calories.
3. **Diet Quality Constraints:** While SNAP supports food security, it does not automatically produce high diet quality (HEI). This failure is structural, driven by the erosion of purchasing power in high-cost areas, the time costs of food preparation, and the behavioral response to the monthly benefit cycle.

In sum, SNAP functions effectively as a safety net that prevents the degradation of health capital (starvation, LBW) but requires complementary interventions—such as price incentives (FINI) or purchasing power adjustments—to actively promote the accumulation of health capital via improved diet quality in the adult population.

**Data Summary of Key Health Capital Metrics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Metric** | **Definition** | **SNAP Causal Impact** | **Strength of Evidence** |
| **Low Birth Weight** | <2,500 grams | **Decreases (-5% to -11%)** | **Strong (Rollout Data)** |
| **Adult BMI** | $kg/m^2$ | **Null / Slight Decrease (Intensive Margin)** | **Moderate (IV/Panel)** |
| **Child Obesity** | BMI z-score $\ge$ 95th % | **Null / Mixed** | **Moderate** |
| **Diet Quality** | HEI-2010 (0-100) | **Neutral (vs. eligible non-participants)** | **Moderate (Selection bias high)** |
| **Metabolic Syndrome** | Composite Index | **Decreases (Long-run exposure)** | **Strong (Rollout Data)** |
| **Food Insecurity** | USDA Module | **Decreases (-15% to -30%)** | **Very Strong** |

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