BEGIN Lab | Behavioral Economics & Global Health Insights

Short-Term Poverty Relief and ART Adherence: Insights from a Natural Experiment of SNAP Recipients

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BACKGROUND

- ART adherence is essential for favorable HIV outcomes, yet suboptimal adherence persists, particularly among low-income populations.
- Scarcity theory posits that economic hardship imposes cognitive burdens that undermine health behaviors like adherence.
- Few studies have examined whether poverty relief translates into changes in health behaviors.
- The Supplemental Nutrition Assistance Program (SNAP), the largest US anti-poverty program (~42 million recipients), provides monthly cash-like benefits for low-income Americans to purchase food.

METHODS

- **Participants:** SNAP recipients with HIV reporting ≥2 missed ART doses/month
- **Outcome**: Daily ART adherence measured via electronic pill caps over 4 months
- **Natural Experiment Design:**
  - SNAP payment dates are randomly assigned at enrollment (like an RCT)
  - Predictable "SNAP cycle": scarcity relief after payment → recurrence by month's end
- **Analysis**: Bayesian hierarchical change point model estimating when and by how much adherence shifts after SNAP payment (random effects for participant and cycle)

Table 1. Participant Characteristics.

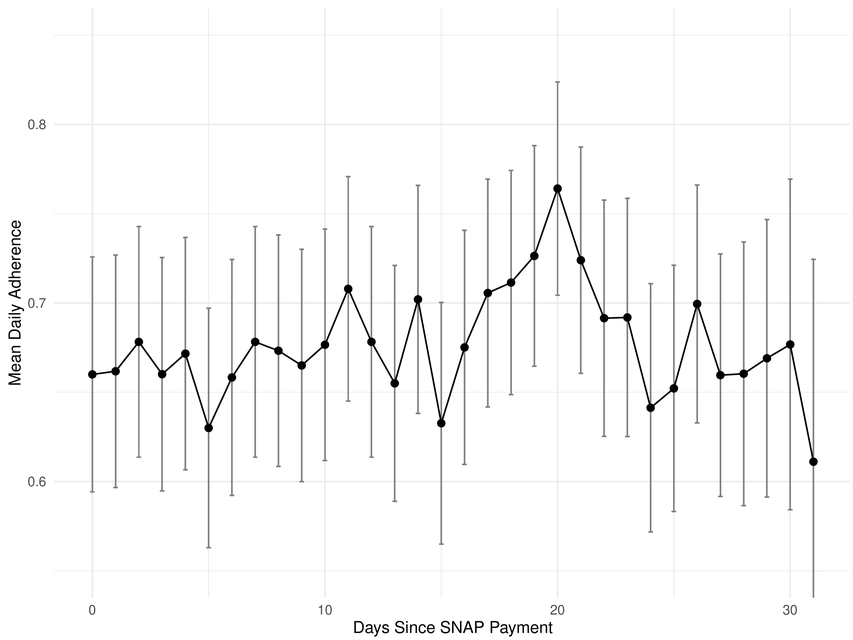
Category	Characteristic	N = 54[1]
Socio / demographic	Age, years	55 (37, 60)
	Male Sex	40 (74%)
	Black Race	48 (89%)
	Education Level ≥High School	48 (89%)
	Own/Rent Housing	29 (54%)
	Household Size	2 (1, 3)
Economic	Income < 100% federal poverty (N=47)	34 (72%)
	Monthly SNAP Benefit ($)	291 (203, 292)
	Low / Very Low Food Security	54 (100%)
	Low Financial Well-Being (CFPB) (N=50)	29 (58%)
Health & Behavioral	Self-Rated Health Excellent/Good	19 (35%)
	Unhealthy Days Out of Last 30 (HR-QOL4) (N=53)	10 (3, 30)
	Cigarette Dependence (CDS-5) (N=23)	28 (18, 55)
	Alcohol Risk Moderate/High (AUDIT-C)	7 (13%)
	Illegal Drug Use (Last 30 Days)	21 (39%)
Psychosocial	Moderate or Serious Distress (Kessler-6)	35 (65%)
	Perceived Stress Level (PSS-4) Moderate or Higher (N=53)	50 (94%)
	HIV Stigma Level (HIV Stigma Scale) Moderate or Higher (N=50)	46 (92%)

[1]Median (Q1, Q3); n (%)

Short-term poverty relief through the Supplemental Nutrition Assistance Program (SNAP) improves ART adherence

…but the effect fades as benefits deplete, with a 12-percentage point drop by month's end.

Figure 1. Observed daily adherence by day since SNAP payment (participant-averaged). Error bars = 95% CI.



RESULTS

- 58 participants enrolled, 54 analyzed; 5,609 person-days of follow-up (Table 1 shows participant characteristics)
- Mean adherence: 67% (95% CI 61, 74) (Figure 1 shows observed trends)

- *Change Point Model* (Figure 2 shows posterior densities)
  - Adherence peaked day 20 post-payment (95% CrI 9, 27), then declined 12 percentage points by month's end (95% CrI 4, 20)
  - 97% posterior probability that the slope decreased after the change point.
  - Post-change point decline rate: 0.8 pp/day after change point (95% CrI −2.0, −0.1)

CONCLUSIONS

- Medication adherence rose following each SNAP payment, then fell sharply toward the end of the monthly benefit cycle.

- To our knowledge, this is the first study to causally link SNAP benefit timing with ART adherence, showing that monthly variation in financial stress influences daily health behavior.

- With upcoming SNAP policy changes expected to reduce participation, these findings underscore poverty alleviation as a lever for HIV outcomes.

Figure 2. Posterior Distributions of Estimated Parameters for Medication Adherence during the SNAP benefit cycle. Bayesian hierarchical change point model.

