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Peer Effects in Adherence to HIV Treatment: Evidence from Malawian Teen Clubs

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Research Question

- A growing body of economic research emphasizes the importance of social networks in shaping health behavior
- These peer effects are especially relevant where individual behavior produces externalities, such as in infectious disease management
- Majority of this work focuses on single or short-term health decisions, and often relies on self-reported social ties or assigned peer groups

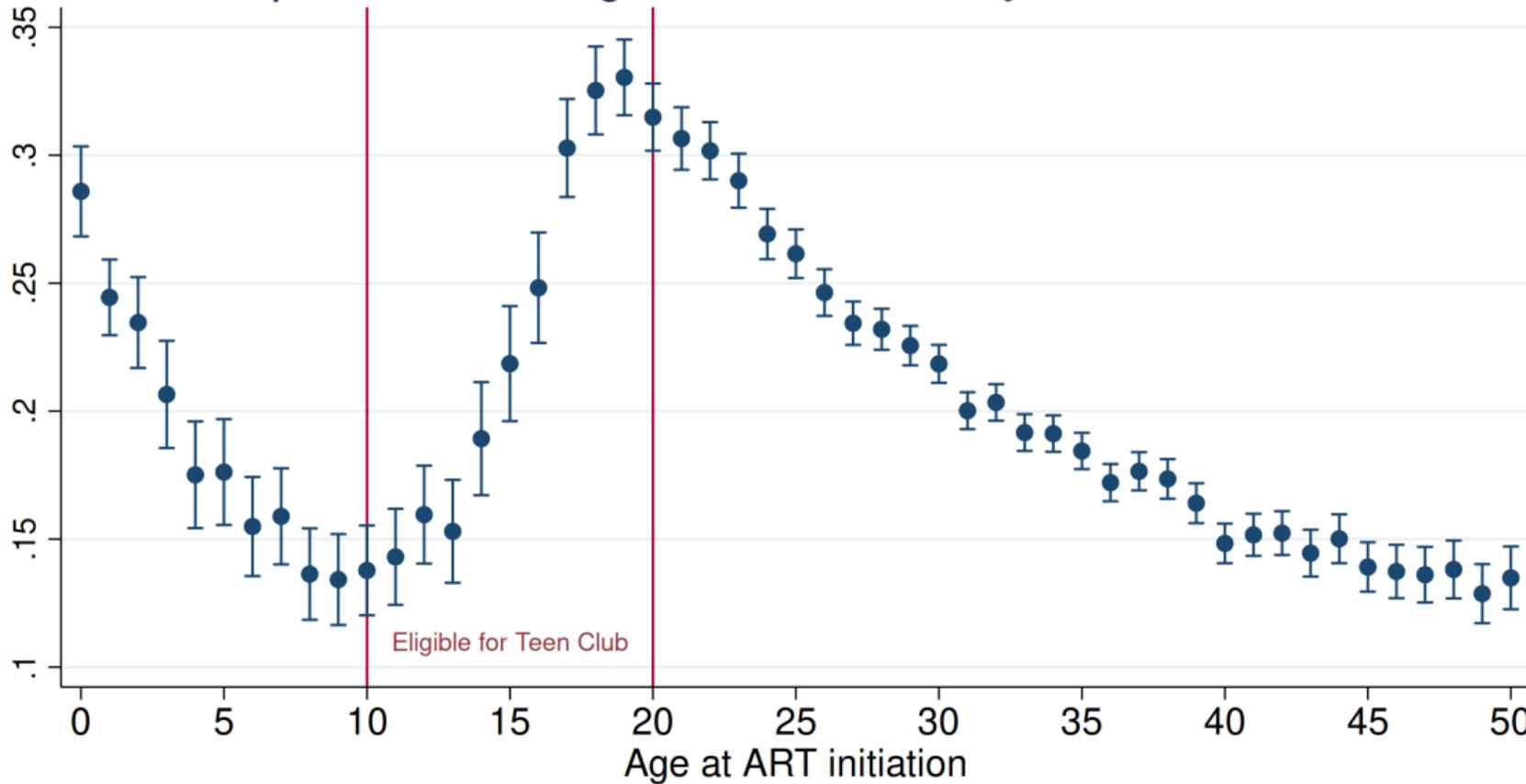
Research Question

- How do peer influences affect adherence to a free, life-saving treatment for chronic illness?
- This paper contributes empirical estimates to the peer effects literature from
 - repeated high-stakes health decision-making
 - in a real-world setting with organic and dynamic networks
 - where long-term health outcomes are observable
- Also provides policy-relevant evidence supportive of group-based health care, a model with mixed results in prior research, in the presence of strong social multipliers

This Paper

- Antiretroviral therapy (ART) is a treatment for HIV which can result in near-normal life expectancy for people living with HIV and almost zero risk of transmission
- This paper provides novel causal evidence on the impact of peer behaviour on ART adherence among adolescents living with HIV in Malawi, a group that is:
 - developmentally sensitive to peer dynamics
 - disproportionately affected by poor health outcomes in the context of HIV
- Focuses on networks defined by Teen Clubs, a program developed in South and East Africa which provides group counseling and activities, dedicated clinic time on weekends, sexual and reproductive health education, and support for ART adherence

Share of patients no longer in treatment 1 year after ART initiation



This Paper

- Estimates the effect of Teen Club roll-out on patient adherence to ART using a staggered difference-in-differences strategy, finding that
 - Teen Club led to a **30% increase in scheduled ART visit attendance** over the nine years after Teen Club implementation
- Estimates the effect of peer behaviour on individual long-term adherence to ART using two sources of exogenous variation as instruments:
 - Rainfall on the day of peer scheduled ART visits as shocks to the cost of visiting the clinic
 - Peer attendance record prior to the individual's ART initiation or Teen Club participation

Data and Empirical Strategy

- High-frequency electronic medical records of HIV treatment from 73 Malawian clinics
- Almost 40,000 adolescent patients across 12 years and 19 out of 28 districts in Malawi
- Identifying variation for the effect of Teen Club program is the timing of Teen Club roll-out at each clinic, collected from clinic staff or district co-ordinators, which should be unrelated to trends in ART adherence and unanticipated
- Primary adherence outcome: on-time attendance of scheduled visit to refill medication

Data and Empirical Strategy

Some challenges and proposed solutions:

- Endogenous attrition from data post Teen Club roll-out
 - Trim outcomes based on the estimated impact of Teen Club on scheduled visits to obtain lower and upper bounds for coefficients as in Lee (2009), relaxing monotonicity assumption that Teen Club does not induce dropping out of sample following Okamoto (2025)
- Many potential mechanisms
 - Instrumental variables strategy to estimate effect of peer adherence on individual adherence within networks defined by Teen Club attendance together
- Teen Club roll-out causes patient selection into clinics
 - Demean outcome by patient, identifying off patients who initiated ART prior to Teen Club

Effect of Teen Club program: Staggered difference-in-differences

$$Y_{iq} - \bar{Y}_i = \beta_0 + \beta_1 Post_{cq} + X_{iq}\mu + X_{cq}\theta + \delta_c + \delta_q + \epsilon_{iq}$$

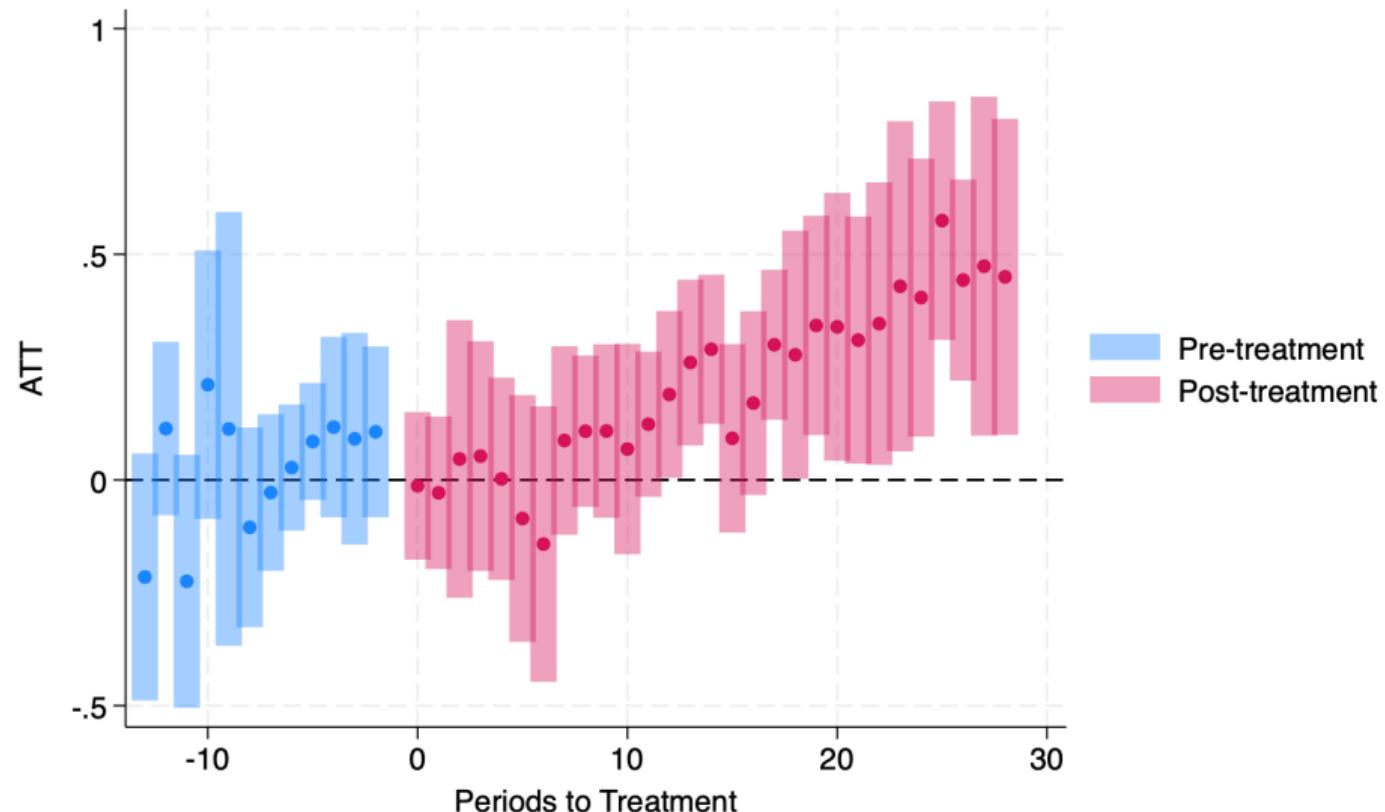
- Y_{iq} is patient i 's ART adherence in quarter q , conditional on having a visit scheduled in that quarter
- $Post_{cq}$ indicates if individual i 's clinic c has implemented Teen Club on or before quarter q
- X_{iq} are time-varying individual-level characteristics (age, time since treatment initiation, and number of scheduled visits in quarter q)
- β_1 represents the effect of Teen Club entry in clinic c on individual i 's ART adherence, using Callaway and Sant'Anna (2021) estimator
- X_{cq} are number of new patients and number of patients with scheduled visits

Effect of Teen Club program on ART adherence

	(1)	(2)	(3)	(4)
Attendance of Scheduled ART Visit				
Post-Teen Club	0.189*** (0.048)	0.174** (0.075)	0.046 (0.043)	0.189** (0.079)
Upper Bound (Lee)	0.231***	0.239***	0.083*	0.248**
Lower Bound (Lee)	0.189***	0.174**	0.046	0.189**
Control Mean	0.621	0.621	0.621	0.621
Observations	58,998	58,998	58,998	58,998
Clusters	73	73	73	73
Clinic Growth Control		X		X
Individual FEs Demeaned			X	X

Standard errors, in parentheses, are clustered at the clinic level. * $p < .1$, ** $p < 0.05$, *** $p < 0.01$

Effect of Teen Club program on ART adherence





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Thank you!

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