Schooling, Income, and HIV Risk:
Experimental Evidence from a Cash Transfer Program.

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Summary

- In this study, we investigate the impact of a cash transfer program for schooling in Zomba, Malawi on HIV & HSV-2 infection among adolescent girls and young women.
  - 18 months after the start of the randomized controlled trial, HIV prevalence among baseline schoolgirls in program areas was 60% lower than the control group. HSV-2 prevalence was more than 75% lower.
  - The program had **no effect** on the HIV or HSV-2 status of those adolescent girls and young women who had already dropped out of school at the start of the program (baseline dropouts).

Summary

- The program effects were concentrated among a small group, who became sexually active before the program and continued being active during the program ('always active').
- The program impact on HIV was not only due to a reduction in the number of lifetime sexual partners and the frequency of sexual activity, but also owes in large part to a significant increase in partner's safety.
- Evidence points to increased income, rather than schooling, as the main channel for the reduction in HIV prevalence.

We need 'behavior change', but how?

- Behavior change interventions usually include some combination of education, motivational counseling, skills building, condom promotion, risk reduction planning, and improved sexual and reproductive health services.
- "…has highlighted the reality that current behavior change interventions, by themselves, have been limited in their ability to control HIV infection in women and girls in low- and middle-income countries." (McCoy, Kangwende, and Padian, 2009)

Education as a "Social Vaccine" for HIV

- There is a lot of evidence showing an association between school attendance, sexual behavior, and HIV prevalence (Jukes, 2008; Beegle & Özler, 2007). Possible pathways include:
  1. Incentives to avoid pregnancy, and
  2. Smaller sexual networks.

- However, this correlation could be driven by various factors:
  - 'good kids'
  - valuation/expectations of the future
  - quality of parenting

- There is only one study that points to a possible causal link between school attendance and sexual behavior (*Duflo et. al., 2006*).

Cash Transfers, Sexual Behavior, HIV risk

- There may also be an 'income effect' on the sexual behavior of young women associated with cash transfer programs.

- Large literature on transactional sex, a lot of which focuses on young women:
  - Luke (2006), Poulin (2007), Dupas (forthcoming), Robinson and Yeh (forthcoming).

- In our data, at baseline, approximately 25% of the young women who are sexually active stated that they started their relationship because they "needed his assistance" or "wanted gifts/money".
  - Second only to "love" (28%).

Schooling, Income, and HIV Risk

- Conditional Cash Transfers for schooling can increase income and school enrollment simultaneously.
- Zomba Cash Transfer Program (*ZCTP*) was a *two-year* randomized intervention that provided cash transfers to schoolgirls (and young women who had recently dropped out of school) to stay in (and return to) school.
- To our knowledge, this is the first study to assess the impact of cash transfer program for schooling on the risk of HIV infection.

ZOMBA CASH TRANSFER PROGRAM: SAMPLING AND SURVEY DESIGN

Malawi

- Zomba, a district in Southern Malawi, is where our study is located.
- In Zomba, only **9.2% of females** have some secondary education or higher.
- HIV prevalence among **15-24 old women is 9.1%,** compared to 2.1% among males of the same age.
- In Zomba, the HIV prevalence is **24.6% among women 15-49**, compared to a national average of 13.3%.

Sampling and Survey Design

- 3,798 young women were sampled from 176 enumeration areas (EAs) in Zomba, a district in Southern Malawi.
- EAs randomly drawn from three strata: urban, near rural, and far rural.
- All households in each sampled EA were listed using two forms, then the sample selected from the pool of eligible young women.

Sampling and Survey Design

- Eligibility into the program was defined as follows:
  - Eligible *dropouts*: unmarried girls and young women, aged 13-22, already out of school at baseline (<15% of the target population), *AND*
  - Eligible *schoolgirls*: unmarried girls and young women, aged 13-22, who can return to Standard 7-Form 4, enrolled in school at the time of their first interview.
- Otherwise, there was ***no targeting*** of any kind.
- The surveys employed at baseline and at follow-up are comprised of two parts:

Sampling and Survey Design

- Part I is administered to the HH head, and collects information on the following:
  - household roster,
  - dwelling characteristics,
  - household assets and durables,
  - consumption (food and non-food),
  - household access to safety nets & credit, and
  - shocks (economic, health, and otherwise) experienced by the household
  - mortality

Sampling and Survey Design

- Part II is administered to the *core respondent*, who provides further information about her:
  - family background,
  - Education, labor market participation, time allocation
  - health and fertility,
  - **dating patterns, detailed sexual behavior at the partnership level**,
  - knowledge of HIV/AIDS,
  - social networks,
  - own consumption of girl-specific goods (soaps, mobile phone airtime, clothing, braids, handbags, etc.).

Biomarker data for STIs

- Self-reported data on sexual behavior may be unreliable:
  - Understatement of sexual activity will cause attenuation bias,
  - If correlated with treatment status, misreporting will bias the impact estimates.

- 18 months after the start of the intervention, VCT teams visited a randomly selected 50% of the panel sample at their homes. (Refusal rate: 3%, attrition rate: 1%)
  - Why no baseline?
  - Why only 50%?

- Rapid tests for HIV, HSV-2, and Syphilis.

Timeline

- **Baseline data collection**: Sep 2007 – Jan 2008.
- **Cash Transfers begin**: February 2008
- **Follow-up data collection**: Oct 2008 – Feb 2009.
- **Biomarker data collection**: Jun-Sep 2009.
- **Cash Transfer Program ends**: December 2009.

ZOMBA CASH TRANSFER PROGRAM: STUDY DESIGN

Zomba Cash Transfer Program Design

- The 176 EAs were evenly split into treatment and control. Treatment EAs were further split to receive conditional (CCT) and unconditional (UCT) treatment.
- All baseline dropouts received CCTs.
- Transfers were split between parents and the girls.
- Parents received $4-10 per month while the girls received $1-5.
  - The average transfer of $10/month falls well within the range of CCT programs around the world and is significantly lower than a pilot cash transfer program in Malawi, financed by the Global Fund and supported by UNICEF.

Balance in randomization and attrition

- The treatment and control communities look very similar across a whole host of baseline characteristics, implying that the randomized allocation of treatment units was carried out successfully.

- Attrition in longitudinal data was low (<7%) and equal across treatment and control areas.

- See Baird et al. (forthcoming in Health Economics) for more details.

RESULTS: SCHOOLING IMPACTS

Summary of schooling impacts

- The program had large impacts on school enrolment and attendance among *baseline dropouts* and *baseline schoolgirls*.

- The increase among *baseline dropouts* is 44 percentage points: 17% in control vs. 61% in treatment.
  - Marriage and pregnancy rates also declined substantially among this group.

- The decrease in the dropout rate among *baseline schoolgirls* is more than 40% (10.8% vs. 6.3%).

ONE YEAR IMPACTS: BIOMARKER DATA ON HIV AND HSV-2

Prevalence of STDs at one-year follow-up among *baseline dropouts*

Baseline Dropouts	HIV	HSV-2	Syphilis
Control	8.2%	8.2%	1.0%
	207	208	208
Treatment	10.4%	8.0%	1.5%
	211	212	212
Total	9.2%	8.1%	1.2%
	418	420	420

Prevalence of STDs at one-year follow-up among *baseline schoolgirls*

Baseline Schoolgirls	HIV	HSV-2	Syphilis
Control	3.0%	3.0%	0.7%
	800	797	801
Treatment	1.2%	0.7%	0.8%
	492	490	493
Total	2.2%	2.0%	0.7%
	1292	1287	1294

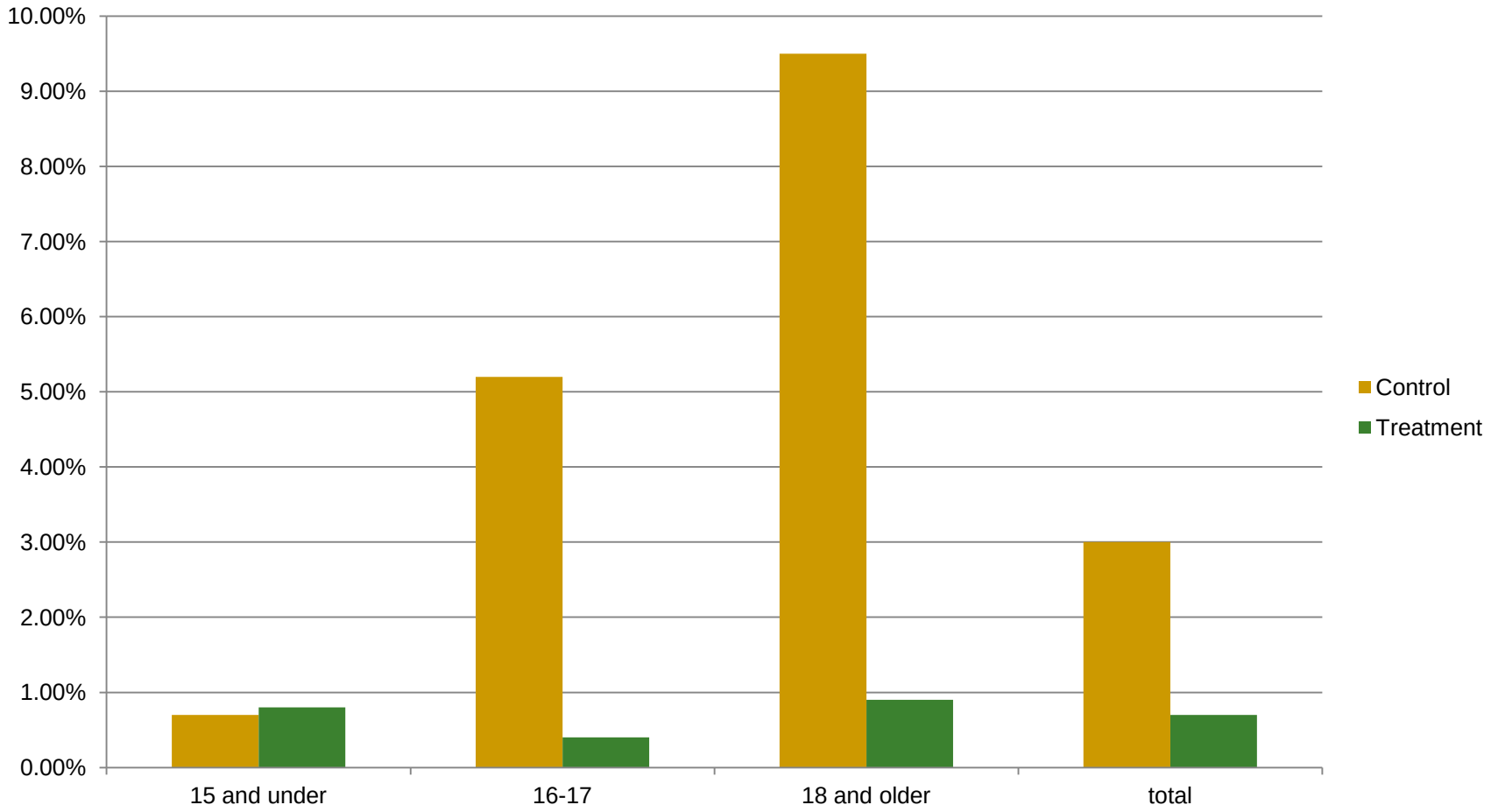
HIV prevalence declined 60% among **baseline schoolgirls**

Dependent Variable: =1 if HIV Positive						
	All		Baseline Dropouts		Baseline Schoolgirls	
Treatment Effect	-0.011	-0.013	0.028	0.027	-0.018*	-0.020**
	(0.010)	(0.008)	(0.028)	(0.029)	(0.010)	(0.009)
Baseline Dropout	0.068***	0.050***				
	(0.014)	(0.014)				
Constant	0.027***	0.071***	0.078***	0.186**	0.030***	0.066***
	(0.008)	(0.020)	(0.017)	(0.082)	(0.008)	(0.021)
N	1,700	1,700	413	413	1,287	1,287
Baseline Controls	No	Yes	No	Yes	No	Yes
note: *** p<0.01, ** p<0.05, * p<0.1						

HSV-2 prevalence declined 77% among **baseline schoolgirls**

Dependent Variable: =1 if HSV-2 Positive						
	All		Baseline Dropouts		Baseline	
Treatment Effect	-0.019**	-0.018**	0.004	0.010	-0.023***	-0.023***
	(0.008)	(0.009)	(0.029)	(0.031)	(0.008)	(0.008)
Baseline Dropout	0.059***	0.031**				
	(0.015)	(0.015)				
Constant	0.029***	0.038**	0.078***	0.082	0.030***	0.038**
	(0.007)	(0.018)	(0.022)	(0.082)	(0.007)	(0.019)
N	1,697	1,697	415	415	1,282	1,282
note: *** p<0.01, ** p<0.05, * p<0.1						

HSV-2 Prevalence by age and treatment status among *baseline schoolgirls*



Summary of impacts on HIV and HSV-2

- The program decreased the prevalence of each of HIV and HSV-2 by more than 60% among *baseline schoolgirls*.
  - The program seems to have stopped the progression of these STIs in their tracks.

- The program had **no** effect on those who had already dropped out of school at baseline.

Are these results simply a reflection of baseline imbalance?

- The answer is NO (very unlikely).
- p-value of 0.017 on HIV impact implies that there is less than a 2% chance that these results are due to baseline imbalance – and this is a conservative estimate. (p-value for HSV-2 is 0.003!!)
  1. Do we see baseline balance among variables we know to be correlated with HIV? YES
  2. While HIV and HSV-2 are correlated, only 25% of those positive for one is infected with the other.
  3. We find program impacts among *baseline schoolgirls*, but **not** *baseline dropouts*.

ONE YEAR IMPACTS: SEXUAL BEHAVIOR

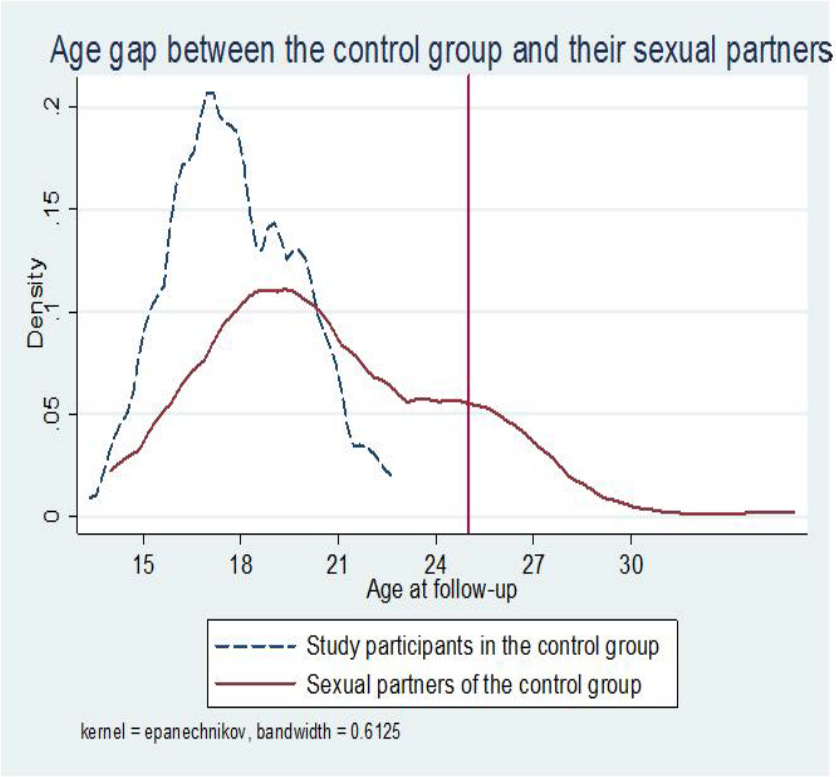
One-year impact on *sexual activity, baseline schoolgirls*

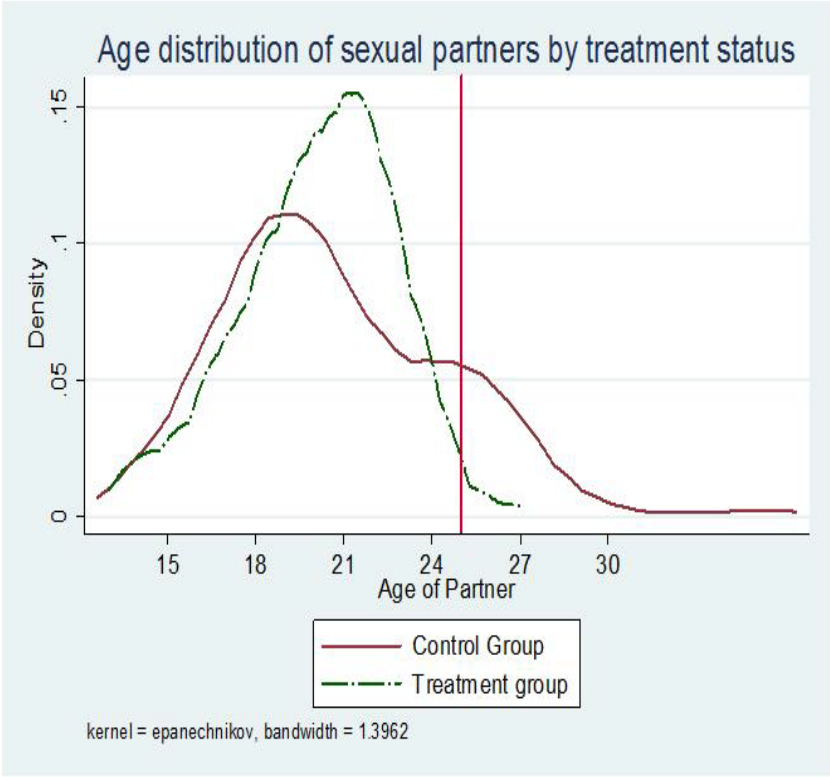
Self-reported Sexual Activity Status at 12-month Follow-up			
	Control	Treatment	ALL
Never active	71.2	72.9	71.9
Newly active	9.4	5.2	7.6
Stops being active	9.8	10.6	10.1
Always active	9.7	11.3	10.4
ALL	100.0	100.0	100.0

HIV Prevalence by *sexual activity status at follow-up, baseline schoolgirls*

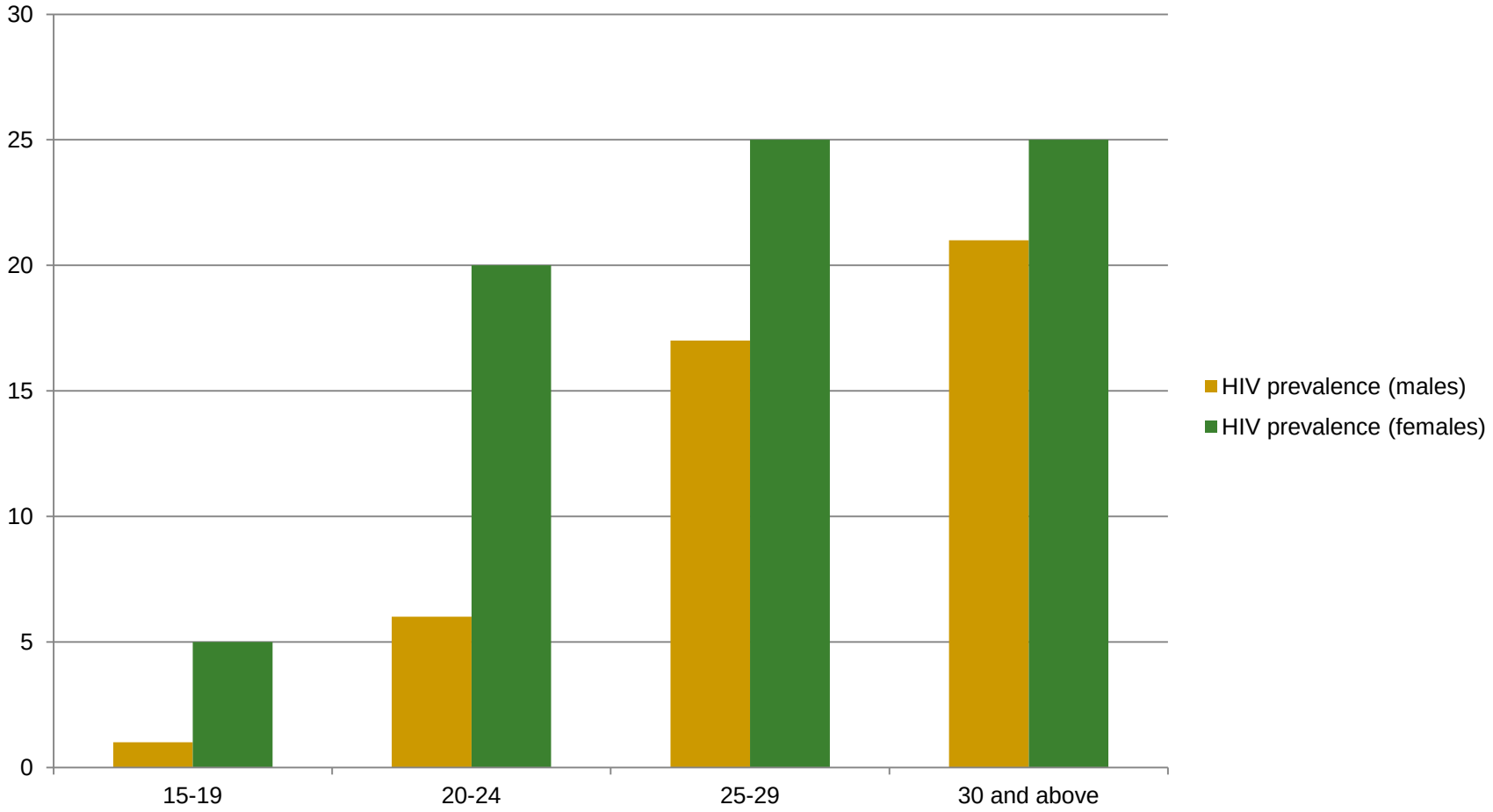
HIV Prevalence by Self-reported Sexual Activity Status			
	Control	Treatment	ALL
Never active	2.1%	1.2%	1.7%
Newly active	2.2%	1.7%	2.0%
Stops being active	1.3%	1.0%	1.2%
Always active	12.3%	1.0%	7.1%
ALL	3.0%	1.2%	2.2%

So, what's the program impact among the 'always active' group?





Why is partner's age important?



Prevalence rates from Malawi DHS (2005)

Summary of program impacts on sexual behavior among the 'always active'

- The increase in the number of lifetime partners between baseline and one-year follow-up is 50% lower among program beneficiaries (0.23 vs. 0.46).
- The increase in the likelihood of having sex at least once a week is 65% lower (9.1 percentage points vs. 26.4 percentage points).
- The likelihood that the sexual partner is 25 years of age or older is less than 2% among program beneficiaries vs. 21% in the control group.
- The likelihood that the sexual partner is tested for HIV (as reported by the core respondent) is 76.5 among program beneficiaries vs. 56.7 in the control group.

ABC or other strategies for risk reduction?

- Program beneficiaries were Being more faithful, but:
  - Impact on Abstinence was too small to cause significant changes in HIV prevalence.
  - There was no program impact on Condom use.

- More importantly, program beneficiaries reduced their HIV risk by selecting their partners more carefully.
  - Watkins (2004) suggests that Malawian girls do this using locally innovative ways.
  - Finding also consistent with Dupas (forthcoming)

Is the impact through increased schooling or income?

Income or Schooling? (using the unconditional treatement group only)

Prevalence of "any STI" by treatment status and school attendance in 2008.

	Did **not** attend school regularly in 2008	Attended school regularly in 2008	Total
Control	14.7%	2.8%	5.2%
Unconditional treatment	0.0%	2.0%	1.7%
Total	11.6%	2.6%	4.3%

Is the impact through increased schooling or income?

- We cannot conclusively state that **keeping girls in school** causes a decline in the risk of HIV/HSV-2 infections.
  - In fact, including current schooling status does not alter our estimates of the treatment impact!

- An **exogenous infusion of cash** to a HH with an adolescent girl causes her risk of STI infection to decline.
  - Number of partners, partner's age, and gifts from partner ALL decline with increased transfer amounts under the program!

- Monthly cash transfers may be successful in affecting behavior change among adolescent girls (Kohler & Thornton, 2009).

Conclusions

- Perhaps, there is a need to weigh (or combine) cash transfer programs against other programs targeting 'behavior change.'
  - There is also a need to replicate these findings in other settings.

- Are we just delaying the inevitable?
  - It remains to be seen whether the longer-term impacts of the program will be as strong as the short-term impacts described in this paper.

Baseline Balance

	Age	Within 16km	Outside 16km	Urban	Mother Alive
Treatment/Control	-0.187	-0.027	-0.028	0.055	0.035
Baseline Difference	(0.183)	(0.142)	(0.051)	(0.151)	(0.043)
	Father Alive	Never Had Sex	Asset Index	Tested HIV	Future HIV Risk
Treatment/Control	0.053	-0.028	0.383	0.028	0.013
Baseline Difference	(0.046)	(0.032)	(0.454)	(0.030)	(0.025)
note: *** p<0.01, ** p<0.05, * p<0.1